VDSL2 CO&CPE Modem
USER'S MANUAL

Best viewed at full screen.

VDSL2 Point to Point Solution

VDSL2 (Very-High-Bit-Rate Digital Subscriber Line 2, ITU-T G.993.2 Standard) is an access technology that exploits the existing infrastructure of copper wires that were originally deployed for POTS services. It can be deployed from central offices, from fibre-fed cabinets located near the customer premises, or within buildings.

ITU-T G.993.2 VDSL2 is the newest and most advanced standard of DSL broadband wireline communications. Designed to support the wide deployment of Triple Play services such as voice, video, data, high definition television (HDTV) and interactive gaming, VDSL2 enables operators and carriers to gradually, flexibly, and cost efficiently upgrade existing xDSL-infrastructure.

ITU-T G.993.2 (VDSL2) is an enhancement to G.993.1 VDSL that permits the transmission of asymmetric and symmetric (Full-Duplex) aggregate data rates up to 200 Mbit/s on twisted pairs using a bandwidth up to 30 MHz.

VDSL2 deteriorates quickly from a theoretical maximum of 200 Mbit/s (Full-Duplex) at 'source' to 100 Mbit/s at 0.3 km (symmetric).

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions before device use.

- DO NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- Use ONLY the dedicated power supply for your device. Connect the power cord or power adaptor to the right supply voltage (110V AC in North America or 230V AC in Europe).
- DO NOT use the device if the power supply is damaged as it might cause electrocution.
- If the power supply is damaged, remove it from the power outlet.
- DO NOT attempt to repair the power supply. Contact your local vendor to order a new power supply.
- Place connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and do NOT locate the product where anyone can work on the power cord.
- DO NOT install nor use your device during a thouderstorm. There may be a remote risk of electric shock from lightning.
- DO NOT expose your device to dampness, dust or corrosive liquids.
- DO NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Connect ONLY suitable accessories to the device.
- Make sure to connect the cables to the correct ports.
- DO NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- DO NOT store things on the device.
- DO NOT use the device outside, and make sure all the commections are indoors. There may be a remote risk of electric shock from lightning.
- Be careful when unplugging the power, because the transformer may be very hot.
- Keep the device and all its parts and accessories out of children's reach.
- Clean the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleansing it.
- This product is recyclable. Dispose of it properly.

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1.Unpacking Information

Check List

Carefully unpack the package and check its contents against the checklist.

Package Contents

- VDSL2 Modem (VDSL2 CO Modem/ VDSL2 CPE Modem)
- Two rubber feet
- User's Manual
- AC to DC 12V Power Adapter
- RJ-45 cable
- RJ-11 cable

Please inform your dealer immediately for any missing, or damaged parts. If possible, retain the carton, including the original packing materials, Use them to repack the unit in case there is a need to return for repair.

2. Installation

Hardware Installation

This chapter describes how to install the VDSL2 CO/CPE MODEM and establishes network connections. You may install the VDSL2 CO/CPE MODEM on any level surface (e.g, a table or shelf). However, please take note of the following minimum site requirements before you begin.

2.1 Pre-installation Requirements

Before you start actual hardware installation, make sure you can provide the right operating environment, including power requirements, sufficient physical space, and proximity to other network devices that are to be connected. Verify the following installation requirement:

- Power requirements: DC12V/1A or above.
- The VDSL2 CO/CPE MODEM should be located in a cool dry place, with at least 10cm/4in of space at the front and back for ventilation.
- Place the VDSL2 CO/CPE MODEM out of direct sunlight, and away from heat sources or areas with a high amount of electromagnetic interference.
- Check if network cables and connectors needed for installation are available

General Rules

Before making any connections to the VDSL2 CO/CPE MODEM, note the following rules:

●Ethernet Port (RJ-45)

All network connections to the Modem Ethernet port must be made using Category 5 UTP for 100Mbps;

Category 3,4 UTP for 10Mbps

No more than 100 meters of cabling may be use between the MUX or HUB and an end node.

●Phone Port (RJ-11)

All Phone set connections to the RJ-11 Port made using 24~26 Gauge phone wiring.

Connecting the VDSL2 CO/CPE MODEM

The VDSL2 CO/CPE MODEM can be controlled by a PC, henceforth, called the "Control PC". For this purpose, you need

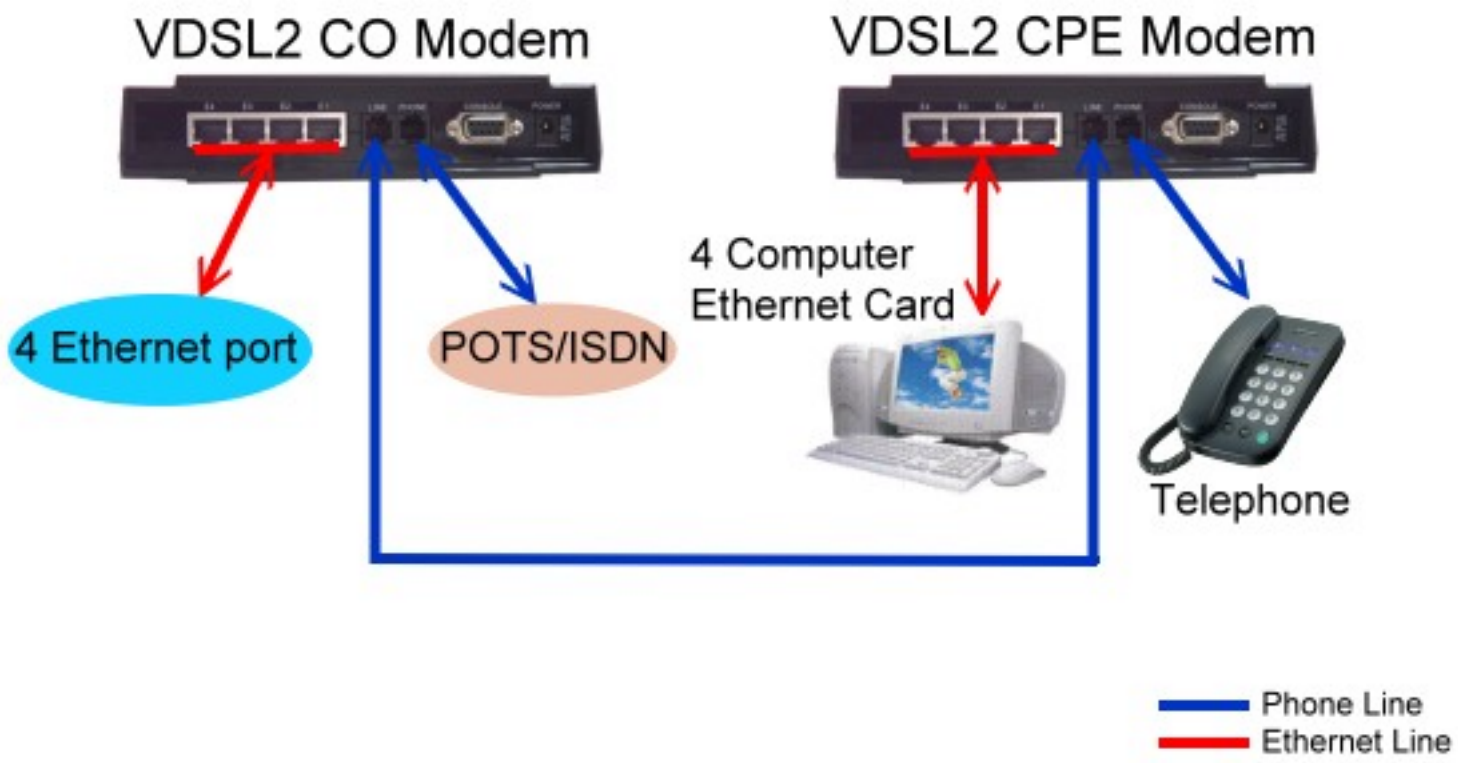
a PC with an Ethernet network interface and a DB-9 RS232 serial interface. Two programs are required: A Web

browser is mandatory and a terminal program should be available optionally.

The board has several connectors.

- 4 Ethernet RJ45 jacks (connect LAN devices to route); the Auto MDIX feature of the ports switches automatically between MDI and MDI-X (MDI = Media Dependant Interface), therefore straight Ethernet cables can be used.
- 2 x RJ11 jack (LINE Port is for connects VDSL client side to Line Interface, Phone port is for connects phone set or FAX machine)

- 1 x Console port (monitoring, access to operating system via shell for firmware downloads, starting drivers and web etc.,)
- 1 Power Supply (as described above)
- Figure 2.1 VDSL2 Point to Point application



3. Hardware Description

This section describes the important parts of the VDSL2 CO/CPE MODEM. It features the front indicators and rear connectors.

Front Indicators

The following figure shows the front panel.

Figure Chapter 3.1 VDSL2 CO MODEM

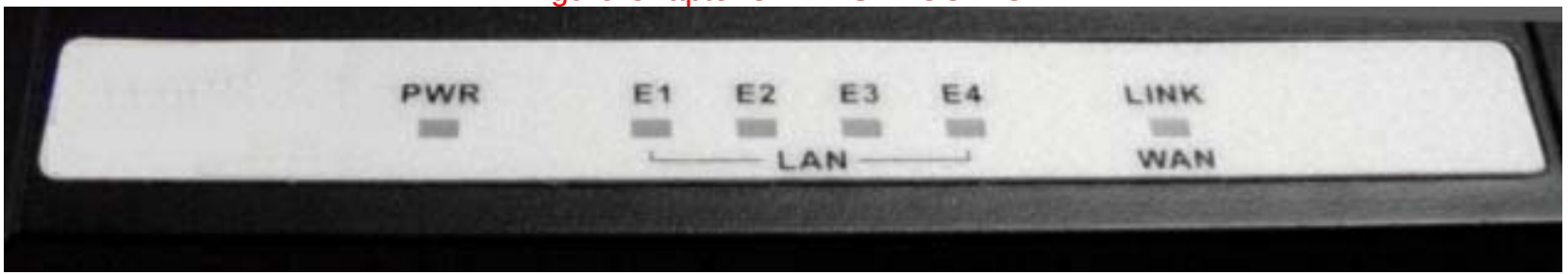
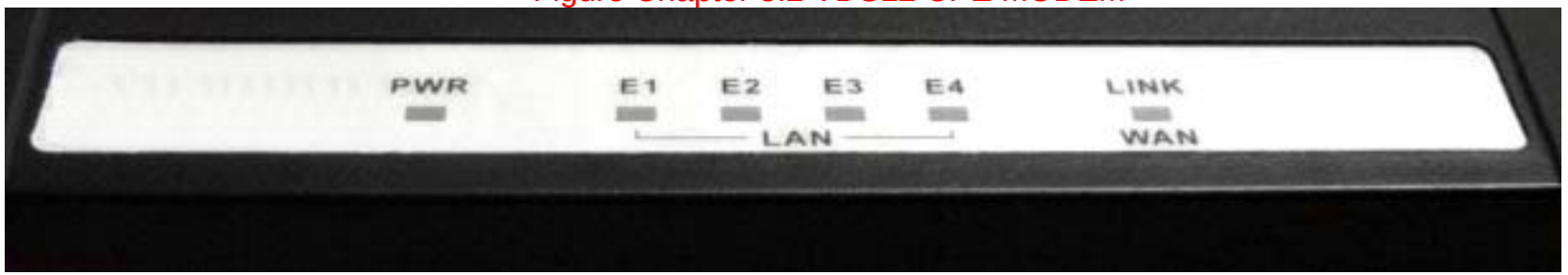


Figure Chapter 3.2 VDSL2 CPE MODEM



Six LED indicators.
At a quick glance of the front panel, it will be easy to tell if the modem has power, signal from its Ethernet RJ-45 port or there is phone line signal RJ-11port

Front Indicators

The following table describes the LEDs.

LEDs	**Color**	**Status**	**Descriptions**
PWR	Green	On	The device is receiving the power and functioning properly.
		Off	The device is not ready or has malfunctioned.
E1~E4 (LAN)	Green	On	The device has a good Ethernet connection.
		Blinking	The device is sending or receiving data.
		Off	The LAN is not connected.
LINK / WAN	Green	On	The Internet or network connection is up..
		Blinking	The device is sending or receiving data.
		Off	The Internet or network connection is down.

Rear Panel

The following figure shows the rear connectors

Figure Chapter 3.3 Rear Connectors

VDSL2 CO/CPE MODEM Rear Connectors

Connectors	**Type**	**Description**
Line	RJ-11	For connecting to the VDSL2 Modem Using a RJ-11 cable
Phone	RJ-11	For connecting to the POTS equipment or ISDN modem
E1~E4	RJ-45	For connecting to a Ethernet equipped device
Console	RS-232	For connecting to PC with RS-232 serial port over a D-SUB Cable

Power On

1. Check the adapter is properly connected.
2. Verify the power LED is steadily on.

4. Configure the VDSL2 CO/CPE MODEM Via Web Browser

The VDSL2 CO/CPE MODEM provides a built-in HTML-based management interface that allow user configure the VDSL2 CO/CPE MODEM via Internet Browser. Recommended use Internet Explorer 6.0 or later version. The recommended screen resolution is 1024 x 768.

In order to use the web browser configure the device, you may need to allow:

- Web browser pop-up windows from your device. Web pop-up blocking is enabled by default in windows XP SP2.
- JavaScripts. (Enabled by default)
- Java permissions. (Enabled by default)

Launch your web browser and input the IP address 192.168.16.249 (VDSL2 CO MODEM) or 192.168.16.250 (VDSL2 CPE MODEM) in the Web page.

4.1 Login.

The default password is "admin".

Figure 4.1 Login

4.2 Select the Menu Level

There is a simple Setup Wizard for end users and an Advanced Setup. The focus of this manual is on the Advanced Setup.

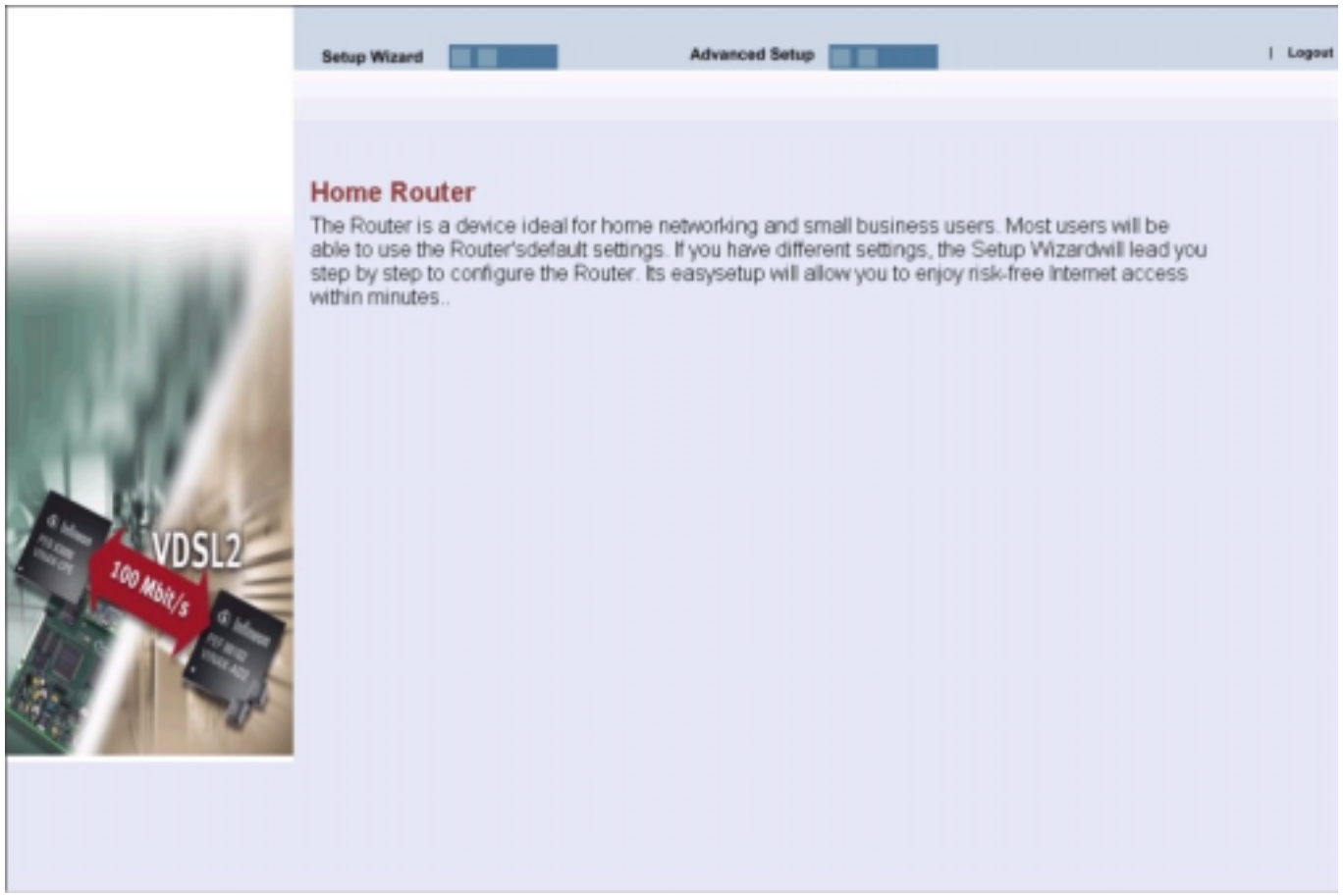

Setup Wizard
Advanced Setup
Logout
Home Router
The Router is a device ideal for home networking and small business users. Most users will be able to use the Router'sdefault settings. If you have different settings, the Setup Wizardwill lead you step by step to configure the Router. Its easysetup will allow you to enjoy risk-free Internet access within minutes..
VDSL2
100 Mbit/s

Figure 4.2 Select the Advanced Setup in the Entry Screen

4.3 Select Advanced Setup

Select the Advanced Setup. The menu below will be used frequently. As an exercise and an example now the IP address will be set.

Figure 4.3 Advanced Setup

Attention: The settings in the following Chapter 4.4 only need to be performed in order to change LAN settings. Such a change may be necessary when connecting the VDSL2 CO/CPE MODEM for the to a new control PC and/or in order to turn the IP address changed via a shell command into a default address for the next restart of the board.

4.4 Select LAN

The menus below will not be used very often. But when connecting the VDSL2 CO/CPE MODEM to a new control PC, you may want to go through the following steps in order to make the IP address previously set by ifconfig in the terminal console permanent. Or on some later occasion you may want to change it again without using the console. Then the menu below will help you too.
In order to set the IP address, click on "LAN Settings".

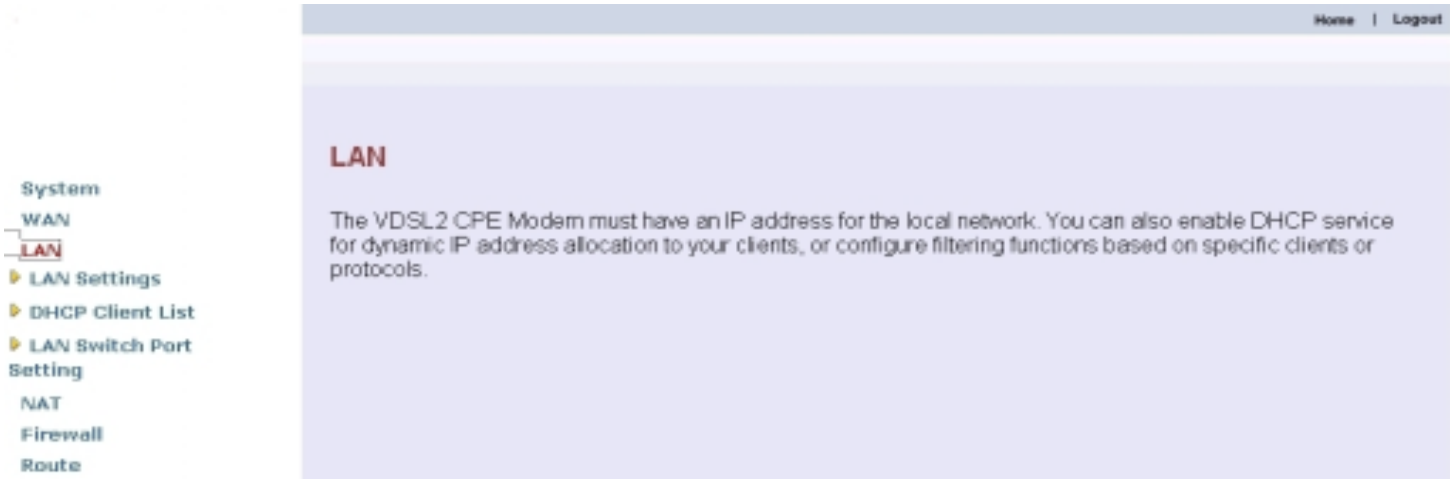

Home | Logout
LAN
The VDSL2 CPE Modem must have an IP address for the local network. You can also enable DHCP service for dynamic IP address allocation to your clients, or configure filtering functions based on specific clients or protocols.
System
WAN
LAN
LAN Settings
DHCP Client List
LAN Switch Port Setting
NAT
Firewall
Route

Figure 4.4 LAN menu

4.4.1 Select LAN Settings and set the IP Address

The form below is used to change the IP address of the LAN port "adm0" in the VDSL2 CO/CPE MODEM.

- The proposed IP address either is the default address of adm0 or it is the address changed by an ifconfig command via the shell running in the terminal.
- The Subnet Mask display can be ignored.
- In case the DHCP checkbox is checked, some additional data and options will be on display (see Chapter 7.2.4.1 on Page 45). The DHCP server is not required to work with VDSL2 in a lab environment. It is recommended to uncheck the box if it is not unchecked already.

Figure 4.4.1 LAN Settings

Now the IP address either may be changed or left as it is. If it has been changed in the form or after it has been changed using the ifconfig command via the shell running in the terminal, it needs to be stored permanently Hit the "APPLY" button in order to make the displayed IP address new default address.

4.4.2 Restart the Settings Dialog

After the "APPLY" button has been hit, the displayed IP address "adm0" port will be stored in a non volatile memory on the VDSL2 CO/CPE MODEM. Also, the Ethernet link between the control PC and the VDSL2 CO/CPE MODEM will be re-initialized – even if the IP address has not been changed. Refresh the display of the HTTP browser running on the control PC and login again.

Figure 4.4.2 Login after Storing the IP Address as Default Value

The VDSL2 CO/CPE MODEM now is prepared to be controlled by the control PC.

5. Building a VDSL2 System

First a quick overview over a complete setup:

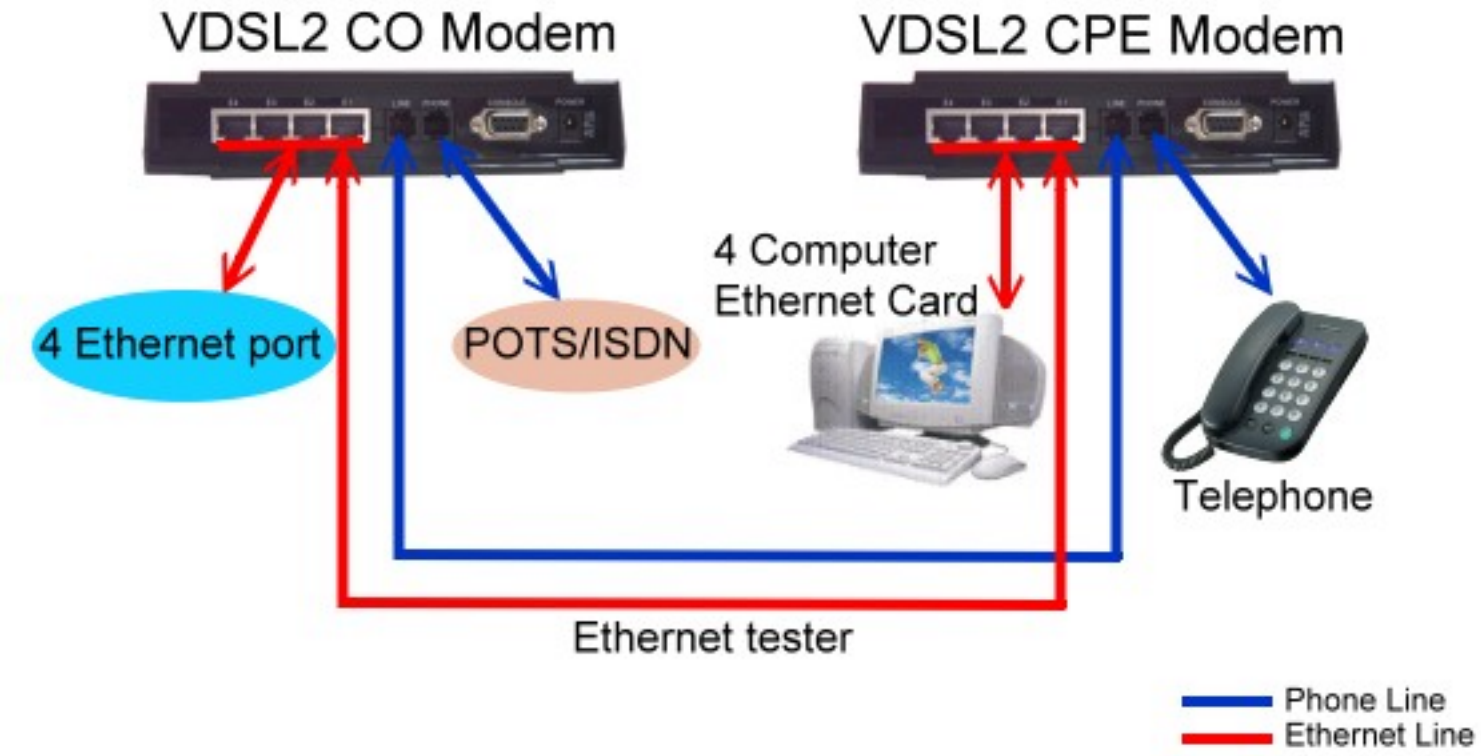


Figure 5 VDSL2 Application

5.1 Connect the VDSL2 CO MODEM and the VDSL2 CPE MODEM to the Line

The objective for VDSL2 is passing data over a twisted pair cable at high speed. In the setup, either such a cable connects the VDSL2 CO MODEM and the VDSL2 CPE MODEM, or a line simulator or any other hardware representation of a cable network, with or without noise injection and crosstalk simulations.

5.2 Connect the VDSL2 CO MODEM and the VDSL2 CPE MODEM to LAN Devices

In the setup, usually a Ethernet tester serves as representation of the LAN side as well as representation of the WAN side.

5.3 Run Demos and Tests

The Ethernet tester may send data downstream as well as upstream. It also receives the data in order to check the integrity of the data transmission.
Different data rates can be tested under different line conditions.

6. Operating the VDSL2 System

After the VDSL2 system has been set up, you may want to configure the settings which are related to VDSL2. Configuration of operation modes, test modes (loop back) and the display of status information is supported by an graphical user interface.

6.1 Configuration Settings

Configure and start the VDSL2 CO MODEM and the VDSL2 CPE MODEM.

- Configuration: As a minimum configuration, usually selecting the bandplan is required.
  See Chapter 6.1.3, Profile Configuration.
- Next, both sides should be activated from the web interface.
  See Chapter 6.1.6, Line Activation
- The connection status of the link can be monitored.
  See Chapter 6.2.1, Line Status

6.1.1 Channel Configuration

This function is for setting VDSL channel.

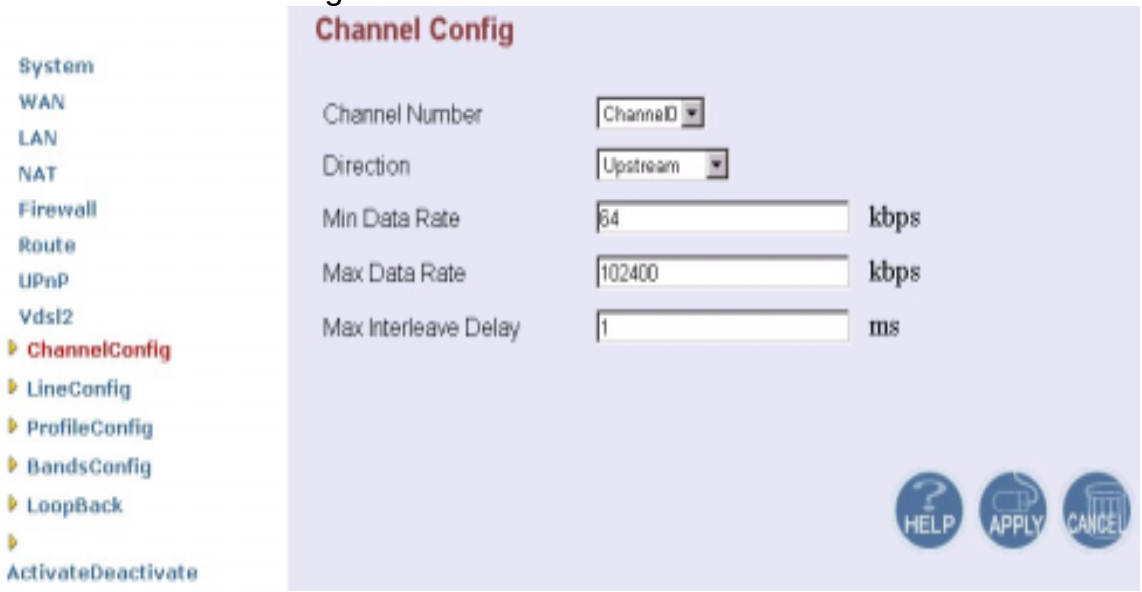


Figure 6.1.1 Channel Configuration Menu

Channel Configuration Settings

Setting	Description
Channel Number	To which bearer channel number shall the settings apply? • Channel 0
Direction	To which direction shall the settings apply? • Upstream • Downstream
Min Data Rate	Minimum Payload Data Rate
Max Data Rate	Maximum Payload Data Rate
Max Int Delay	Maximum Interleaver Delay

Note: The Reboot is needed for saving the new settings.

6.1.2 Line Configuration

Figure 6.1.2 Line Configuration Menu for SNR Margin Selection

Line Configuration

Setting	Description
Direction	Select the target direction.
Target SNRM	Set the required SNR Margin *10 (60=6dB)

6.1.3 Profile Configuration

For this function, VDSL2 CO/CPE MODEM provides world wide telecom standard band plan, such as meet European telecom standard band plan 998(17a), USA telecom standard band plan 997(8a, 8b) and Janpan Telecom standard band plan (30a) etc. Annex A specifies bandplans for the North American region and enables VDSL2 CO/CPE MODEM to be deployed with traditional POTS telephony or in an all-digital mode. Annex B specifies bandplans for Europe and enables VDSL2 CO/CPE MODEM deployment with underlying POTS and ISDN services. Annex C allows VDSL2 CO/CPE MODEM to coexist with TCM-ISDN services, found primarily in Japan.

VDSL2 CO/CPE MODEM has numerous configuration profiles and bandplans to meet regional service provider requirements. The frequency bandwidth has increased to 30 MHz, with configuration options at 8.5 MHz, 12 MHz, 17.7 MHz and 30 MHz.

Note : Please deactivate then activate once when any band profile is being changed. This version does not support ADSL band profile, but will support that in the near future.

Figure 6.1.3 Profile Configuration

6.1.4 Band Configuration

This function is for setting tones for each band.

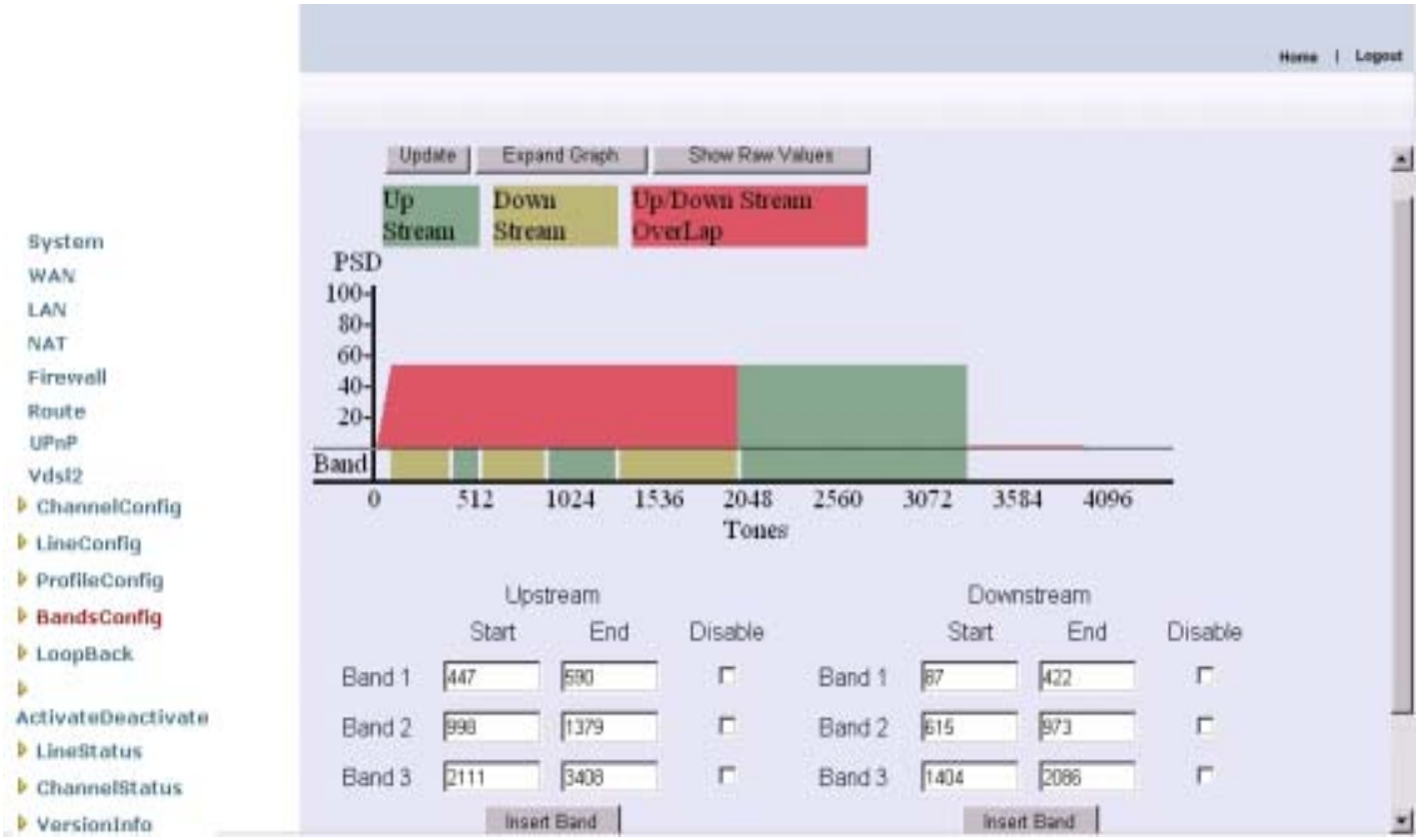


Figure 6.1.4 Band Configuration

6.1.5 Loop Back

The loop back testing function for checking phone wire link problem: 1. System Loop 2. Line Side Loop

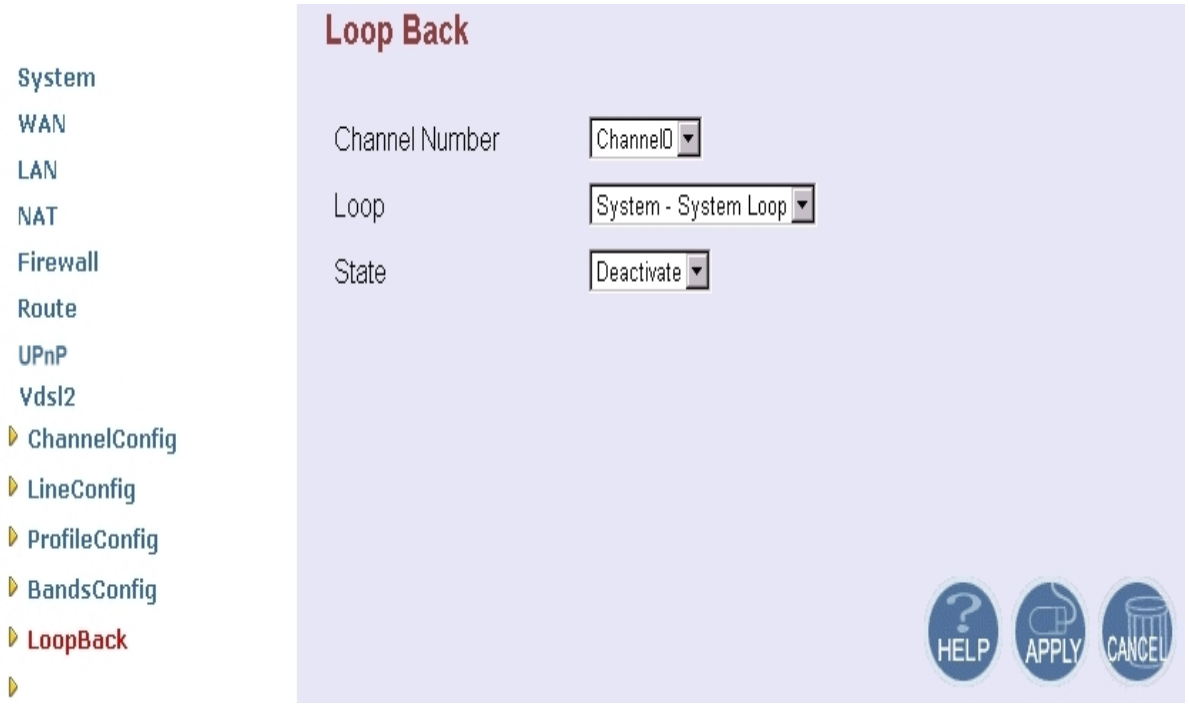


Figure 6.1.5 Loop Back Activation/Deactivation Menu

Loop Back

Setting	Description
Channel Number	To which bearer channel number shall the settings apply? Channel 0

6.1.6 Line Activation

This function is for enable/disable VDSL2 port.

Figure 6.1.6 Activation and Deactivation of the Line

Line Activation/Deactivation

Setting	Description
Line	Activate or deactivate the line. (Select the activity and the press the APPLY button.)

6.2 Status Displays

6.2.1 Line Status

This function provides SNR value for checking phone wiring quality.

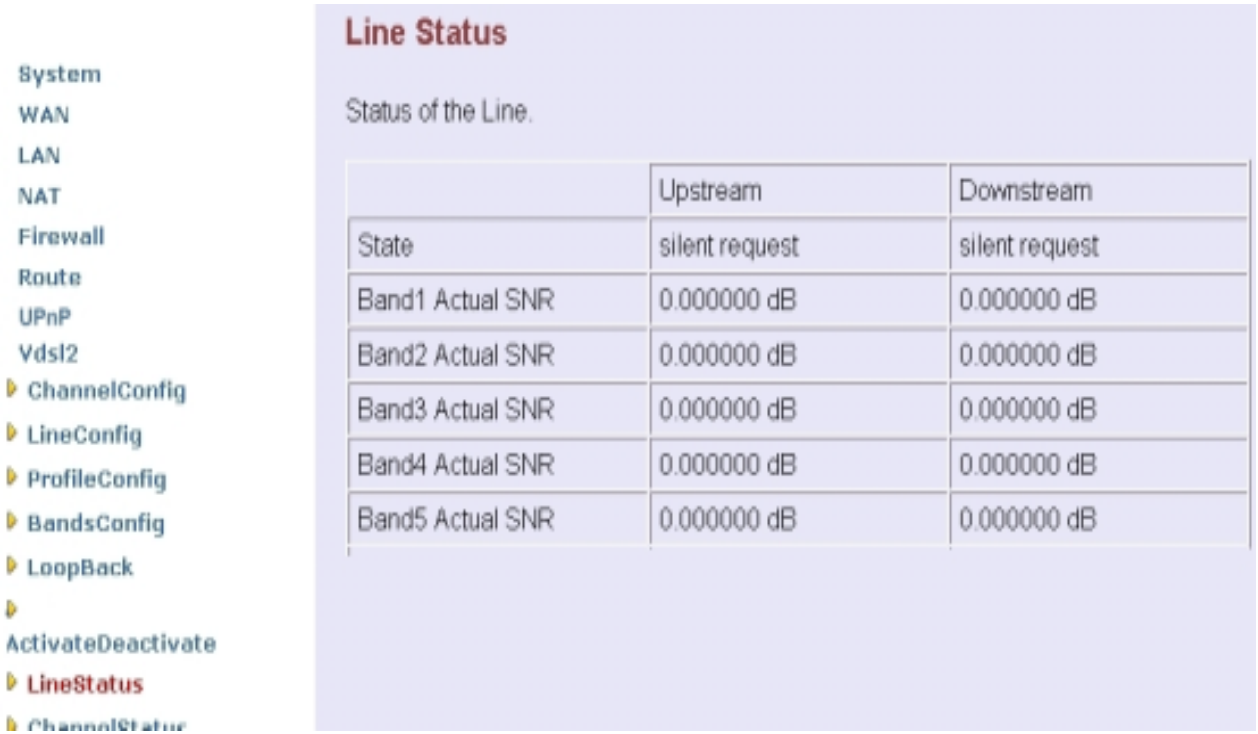


Figure 6.2.1 Line Status Display: Actual SNR

The following status messages may occur: not_initialized, exception, idle request, idle, silent request, silent, handshake, full init, discovery, training, analysis, exchange, showtime no sync, showtime tc sync, fast retrain, lowpower l2, loopdiagnostic, loopdiagnostic complete, resync, test, lowpower l3, unknown

6.2.2 Channel Status

This function shows VDSL2 port status.

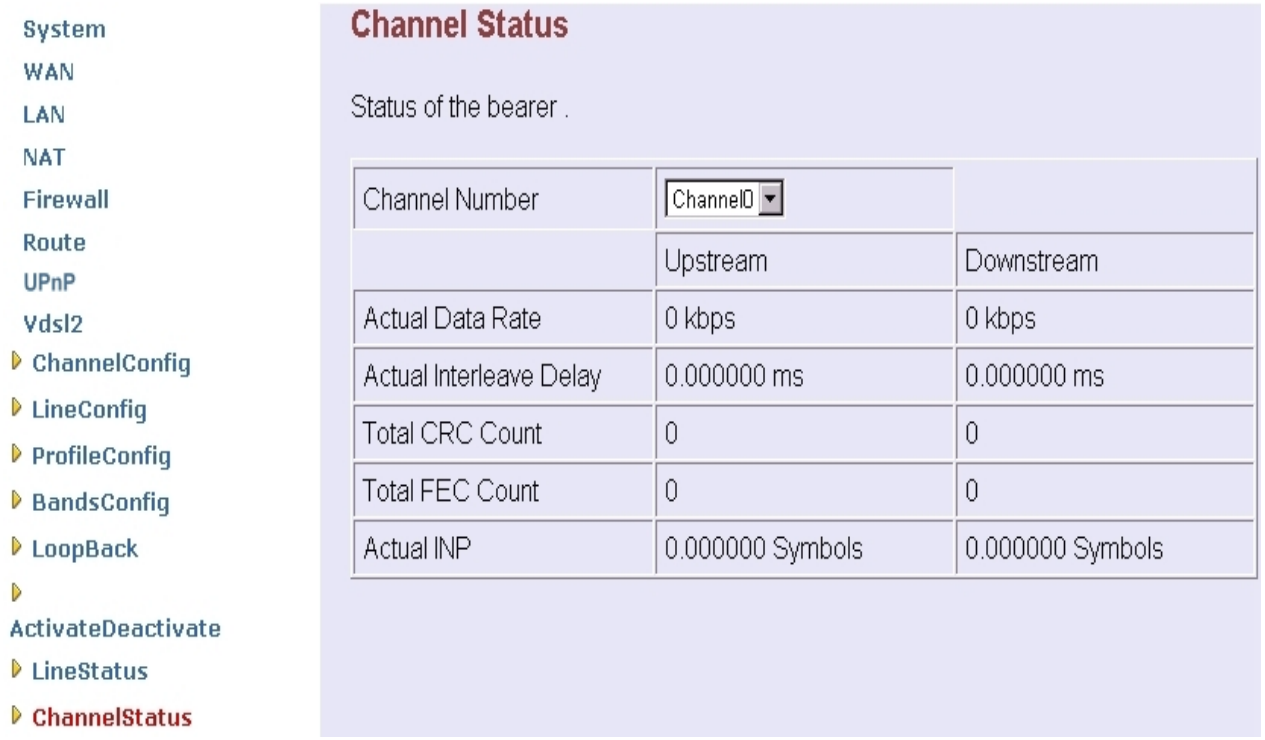


Figure 6.2.2 Channel Status Display: Data Rate, Delay, Error Counters and Impulse Noise Protection

6.2.3 Version Info

This function show hardware and firmware version.

Figure 6.2.3 Display of Version Data

6.2.4 SNR Graphs

When VDSL2 CO MODEM link with VDSL2 CPE MODEM, this graph will show the SNR value for each band.

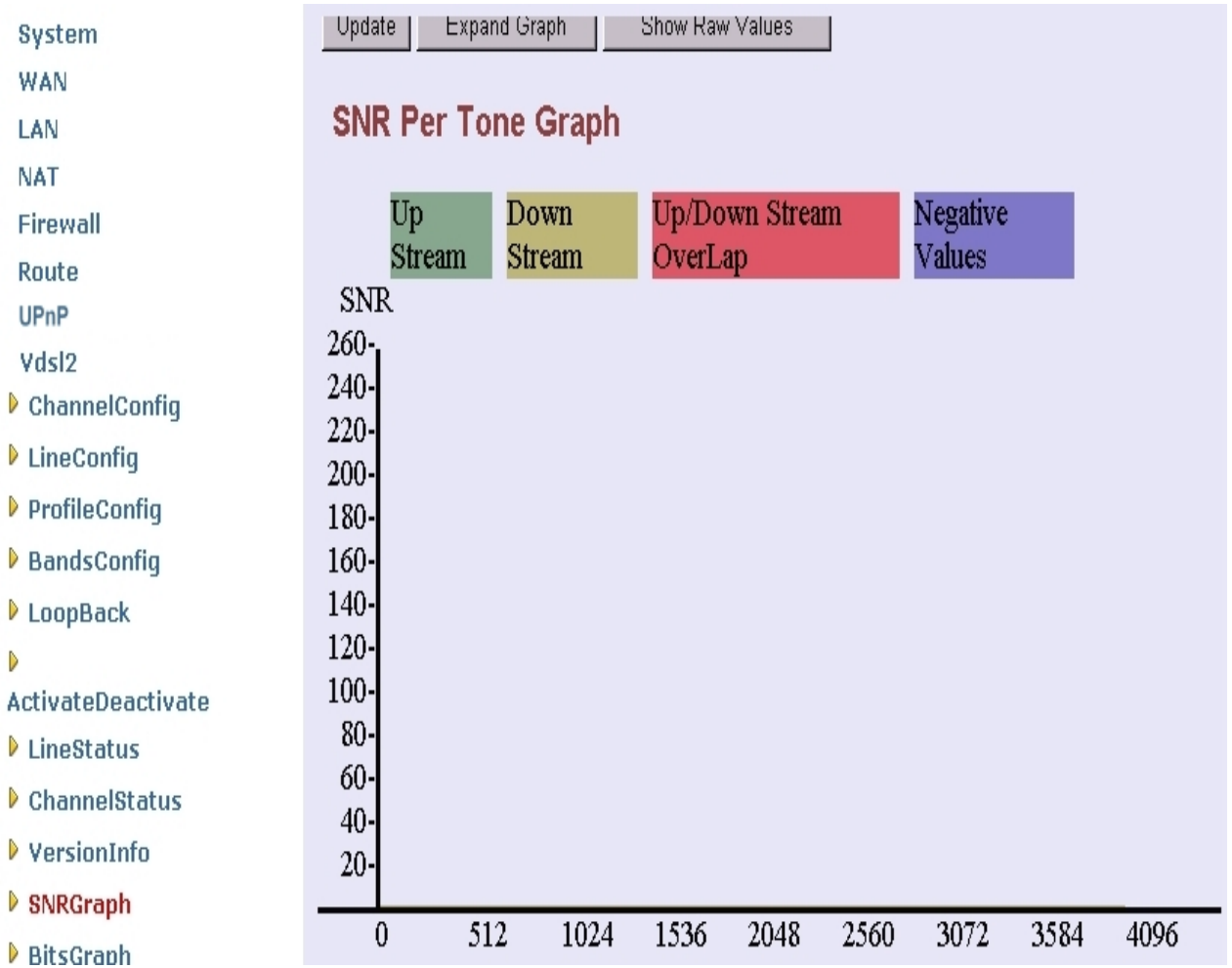


Figure 6.2.4 Display of SNR per Carrier

7. Configuration Interface of the Router

This section explains how to configure the router section of the VDSL2 CO/CPE MODEM using its web-based configuration.

The parts of the circuitry as well as the router configuration menu has been ported from that of the reference kit to the VDSL2 CO/CPE MODEM reference board. As for the menu, There are only a few differences:

- The "adm1" port now is the port to the VDSL2 side. The port on the LAN is "adm0". It supports four Ethernet connections.
- The IP addresses are used in this chapter are different from the examples in the previous chapters.
- The password used in this chapter is different from the examples in the previous chapters.
- The VDSL2 CO/CPE MODEM of course has no menu option for VDSL settings. The VDSL2 CO/CPE MODEM has a VDSL menu which is described in Chapter 6. Also the entry menu (Chapter 4.2) has different "looks" tailored to the VDSL2 CO/CPE MODEM.

7.1 Logging in to the VDSL2 CO/CPE MODEM

To log on to the VDSL2 CO/CPE MODEM Web Application, you must have a valid password. The Administrator creates the log on user with its password. When you log on to the VDSL2 CO/CPE MODEM Web Application, the USER LOGIN window is displayed as shown in Figure 7.1.

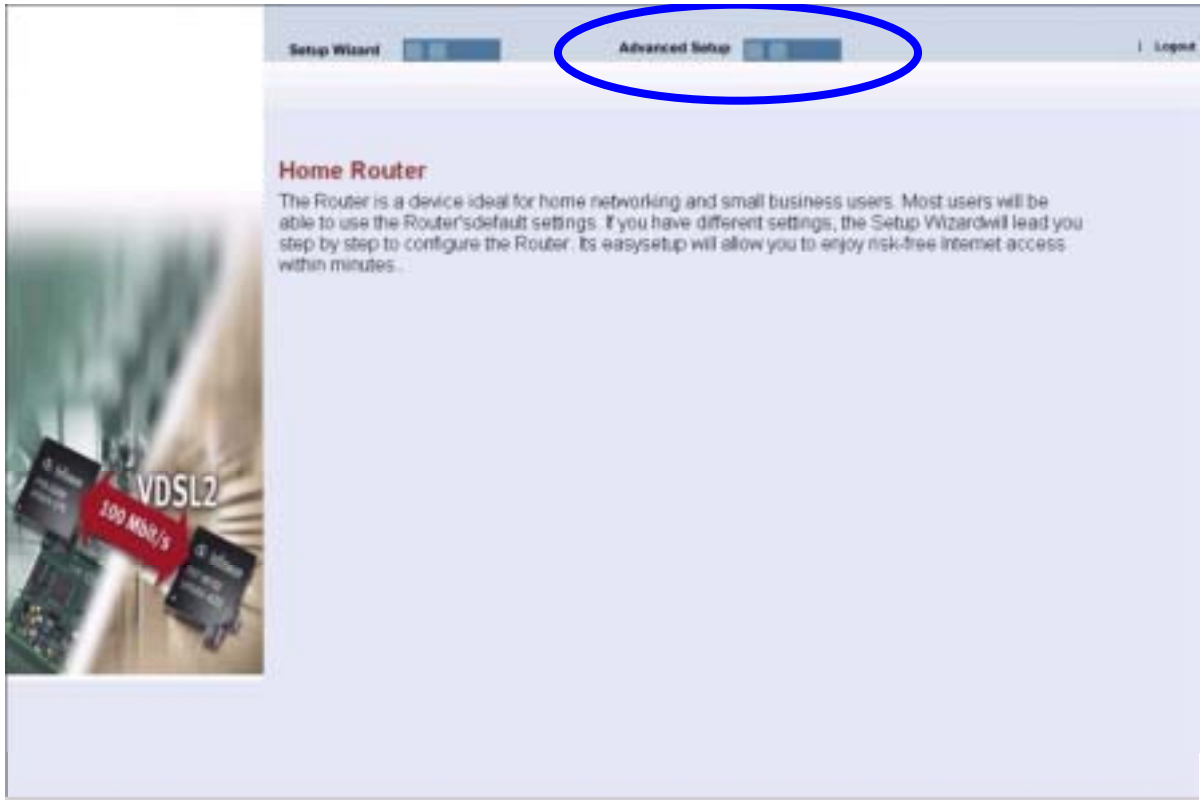
Figure 7.1 VDSL2 CO/CPE MODEM Web Application

In the USER LOGIN window:

1. Enter the password in the Password text box. For an Admin user, the default password is "admin".
2. Click LOGIN to begin the configuration or click CANCEL in the USER LOGIN window to cancel this log on operation.

7.2 Setup Wizard and Advanced Setup

There is a simple Setup Wizard for end users and an Advanced Setup. The focus of this manual is on the Advanced Setup.


Setup Wizard
Advanced Setup
Logout
Home Router
The Router is a device ideal for home networking and small business users. Most users will be able to use the Router'sdefault settings. If you have different settings, the Setup Wizardwill lead you step by step to configure the Router. Its easysetup will allow you to enjoy risk-free Internet access within minutes.
VDSL2
100 MBit/s

7.2.1 Setup Wizard

The Setup Wizard is designed for ease-of-use in order to quickly configure the most common settings. The Admin can view the Setup Wizard link in the homepage. The wizard's first step that allows the admin to configure the system host settings displayed as shown in Figure 7.2.1.

Figure 7.2.1 Setup Wizard's First Step

There are five steps to complete the wizard. Follow the instructions given in each step and enter the desired settings.

7.2.2 Advanced Setup

Click on the Advanced Setup link in the homepage in case you want to configure a wider range of settings. The following configuration options are displayed in the left navigation bar, as shown in Figure 7.2.2:

- System
- WAN
- LAN
- NAT
- Firewall
- Route
- UPnP
- VDSL2

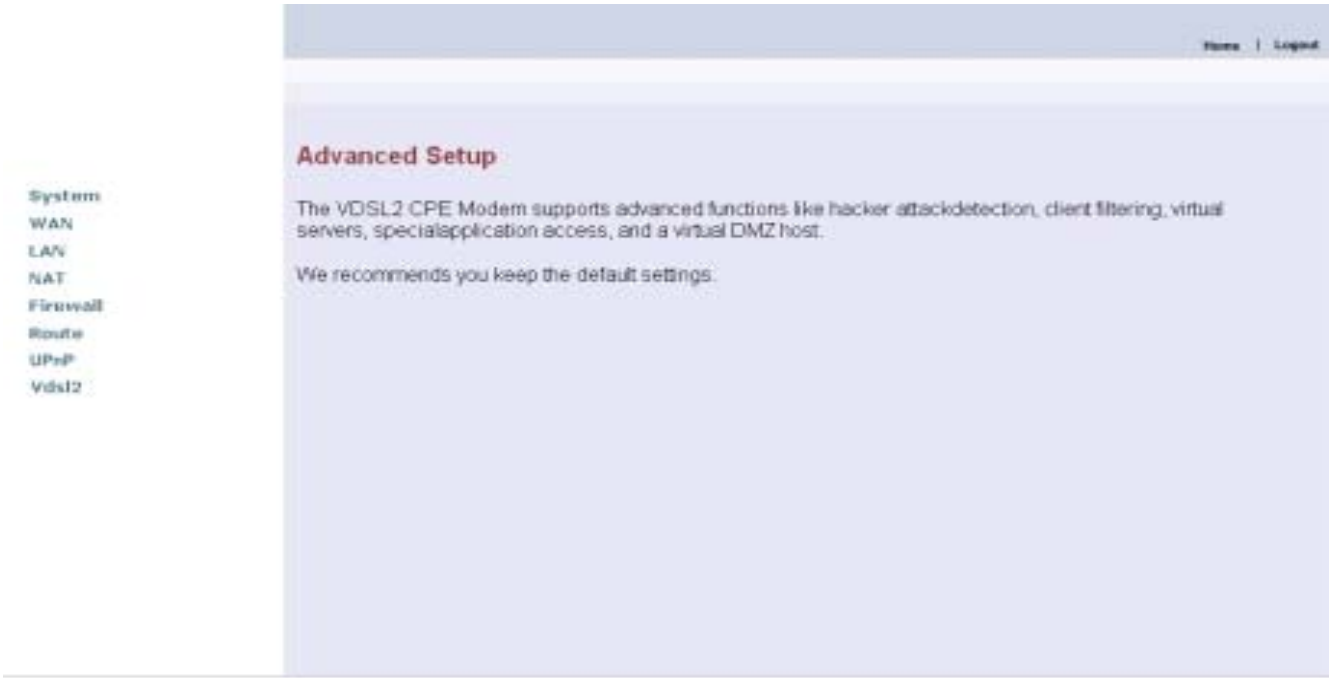


Figure 7.2.2 Advanced Setup

7.2.3 System

The System link can be viewed in the left navigation bar. The following are the options available under System, as shown in Figure 7.2.3 :

- Administrator Settings
- Firmware Upgrade
- Device Mode
- System Status
- System Log
- Reboot
- Reset System

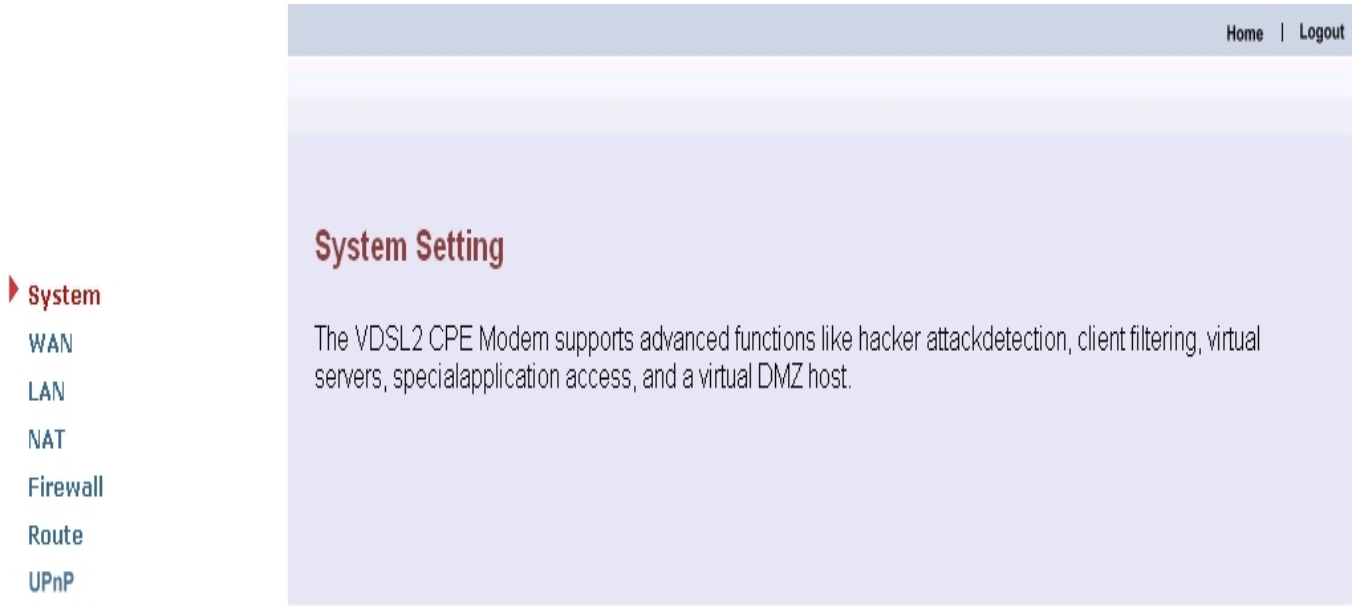


Figure 7.2.3 System in the Left Navigator Bar

7.2.3.1 Administrator Settings

To add a user or change user's password, click on the Administrator Settings link in the left navigation bar. A screen is displayed as shown in Figure 7.2.3.1.

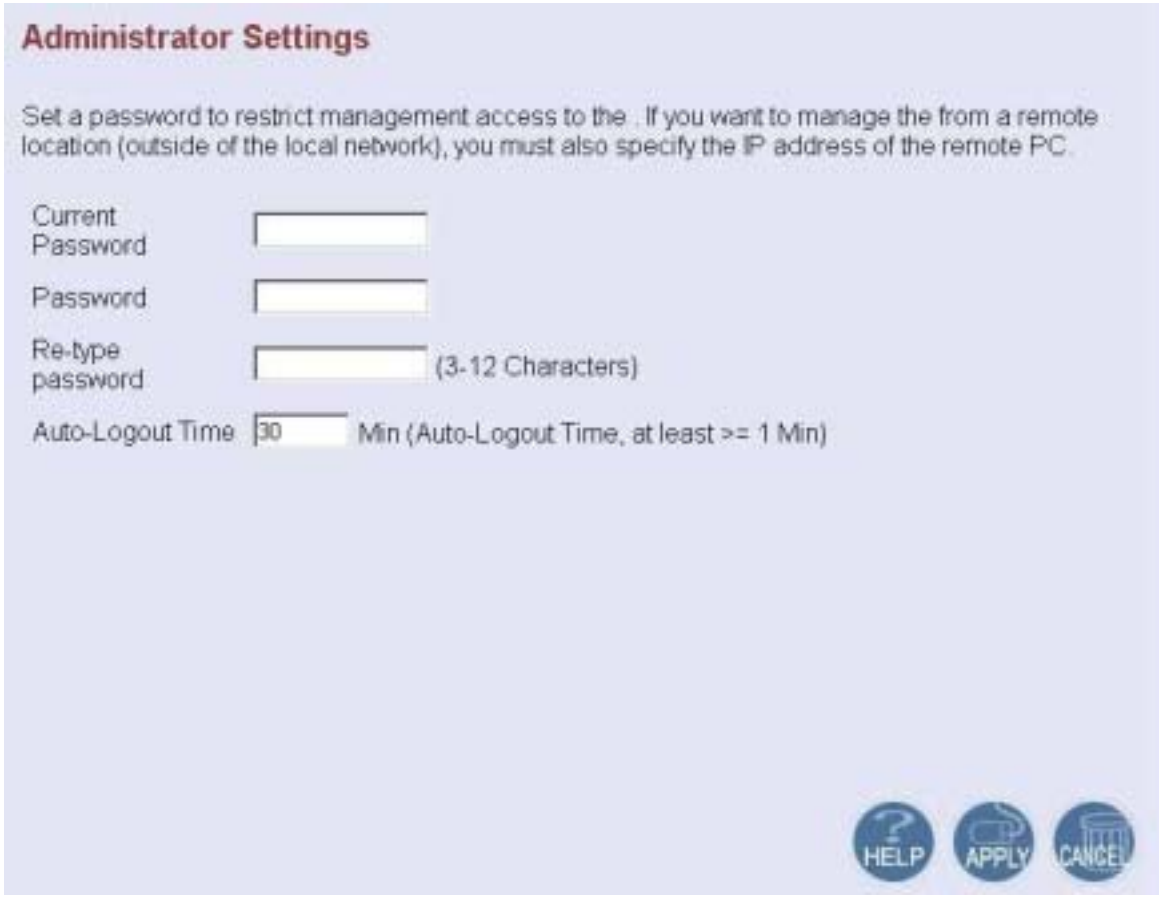

Administrator Settings
Set a password to restrict management access to the . If you want to manage the from a remote location (outside of the local network), you must also specify the IP address of the remote PC.
Current Password
Password
Re-type password
(3-12 Characters)
Auto-Logout Time
30
Min (Auto-Logout Time, at least >= 1 Min)
HELP
APPLY
CANCEL

Figure 7.2.3.1 Administrator Settings Configuration

While adding a user, each user must be assigned a separate port. Hence the number of users that can be added to the system depends on the number of ports available on the VDSL2 CO/CPE MODEM.
The screen contains the following details:

Fields in User Setting

Field	Description
Current Password	This is the password associated with the administrator. This is enabled only for the user Administrator login.
Password	This is the password of the login administrator.
Re-type Password	This is the password verification.
Auto-Logout Time	The auto-logout time, at least one minute.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.3.2 Firmware Upgrade

To update the system firmware, click on the Firmware Upgrade link in the left navigation bar. A screen is displayed as shown in 7.2.3.2

Figure 7.2.3.2 Firmware Update

The screen contains the following detail:

- Click Browse to select a specified file name to change the File Name.
- Click APPLY to start the firmware update.

7.2.3.3 Device Mode

The ADM5120 network processor used in the reference system is able to act as either a switch or a router. Clicking on Device Mode on the left navigation bar allows the user to change the mode of operation, as shown in the following figure.

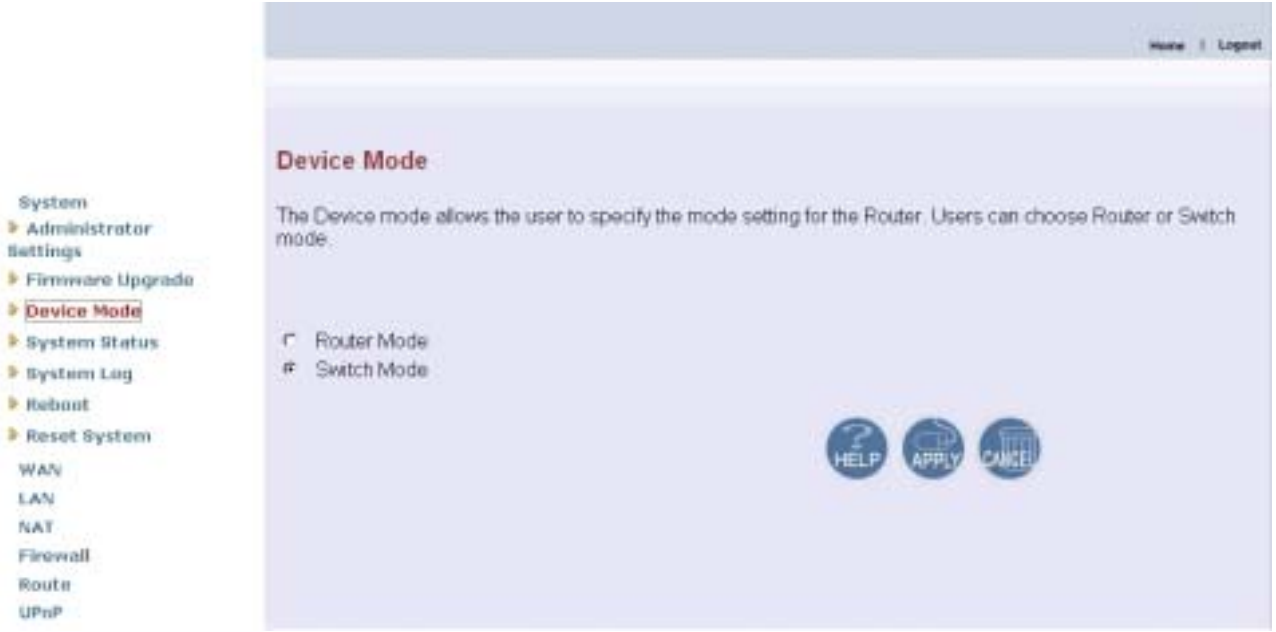


Figure 7.2.3.3 Device Mode

The default setting is in Switch mode, it is not necessary to change the setting in most of the case. In situations, which devices (e.g. PC, Server, VoIP) connected to CPE requires Router function, set the CPE on Router mode. Do NOT set CO on Router mode to avoid the connection failure.

7.2.3.4 System Status

To view system status, click on the System Status link in the left navigation bar. A screen is displayed as shown in Figure 7.2.3.4

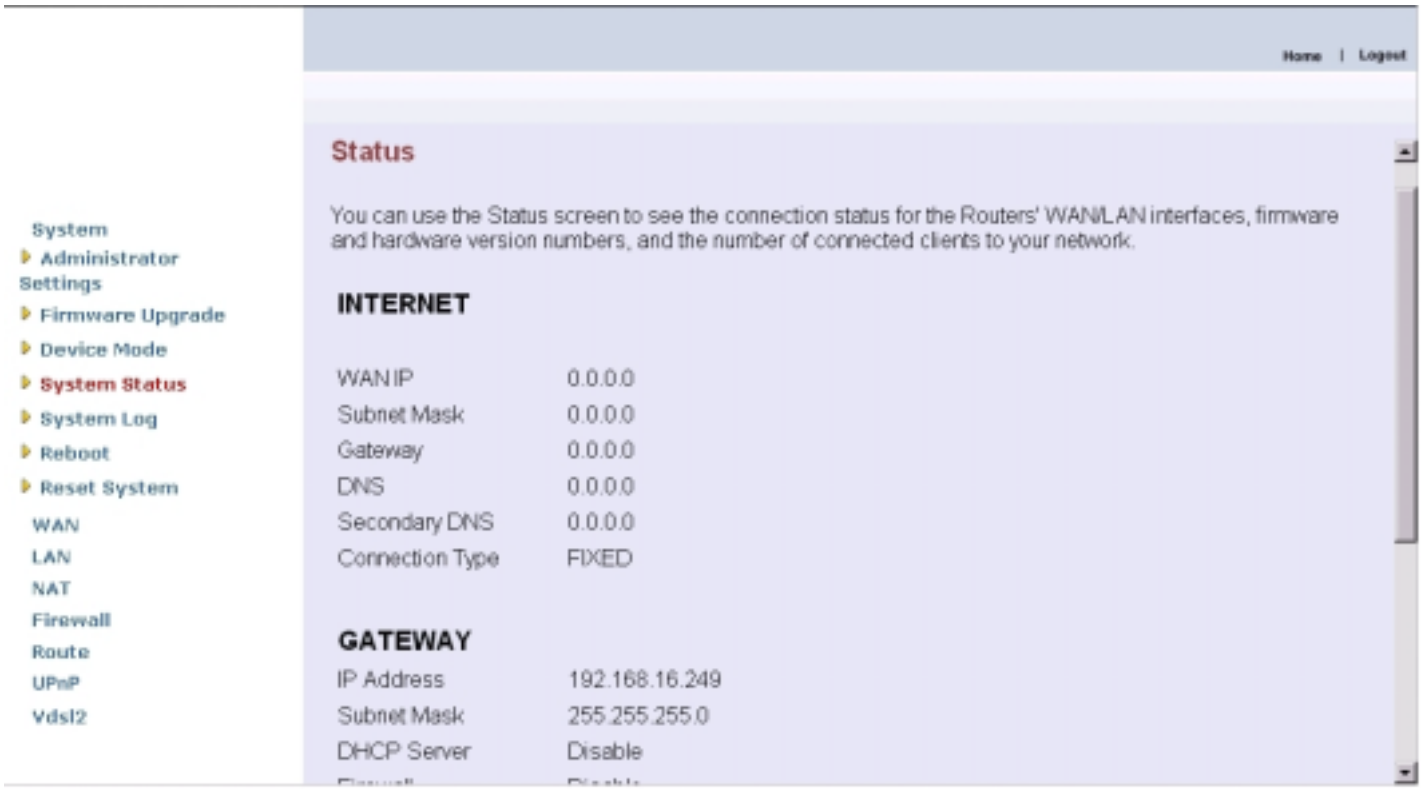


Figure 7.2.3.4 Status Window

This screen displays the status of certain important system parameters. It also offers control over the current DHCP lease for the IP Address.

- Click Release to release IP Address for the WAN interface.
- Click Renew to renew the IP Address for the WAN interface.

7.2.3.5 System Log

To view the system logs, click on the System log link in the left navigation bar. A screen is displayed as shown in Figure 7.2.3.5.

Figure 7.2.3.5 Security Logs

The screen contains the following details:

Fields in Security Logs

Field	Description
Log File	This lists all the system events.

- Click Download to download the log file to the computer.
- Click Clear to clear this page.
- Click Refresh to retrieve system event and update the log file.

7.2.3.6 Reboot

To reboot the unit, click on the Reboot link in the left navigation bar. A screen is displayed as shown in Figure 7.2.3.6.

Home | Logout
System
Administrator Settings
Firmware Upgrade
Device Mode
System Status
System Log
Reboot
Reset System
WAN
LAN
NAT
Firewall
Route
UPnP
Reboot
In the event that the modem stops responding correctly or in some way stops functioning, you can perform a reboot. Your settings will not be changed. To perform the reboot, click on the "Reboot" button below. You will be asked to confirm your decision. The reboot will be complete when the power light stops blinking.
Reboot
HELP

Figure 7.2.3.6 Reboot VDSL2 CO/CPE MODEM Modem

- Click Reboot to reboot the unit.

7.2.3.7 Reset system

To reset the system, click on the Reset link in the left navigation bar. A screen is displayed as shown in Figure 7.2.3.7.

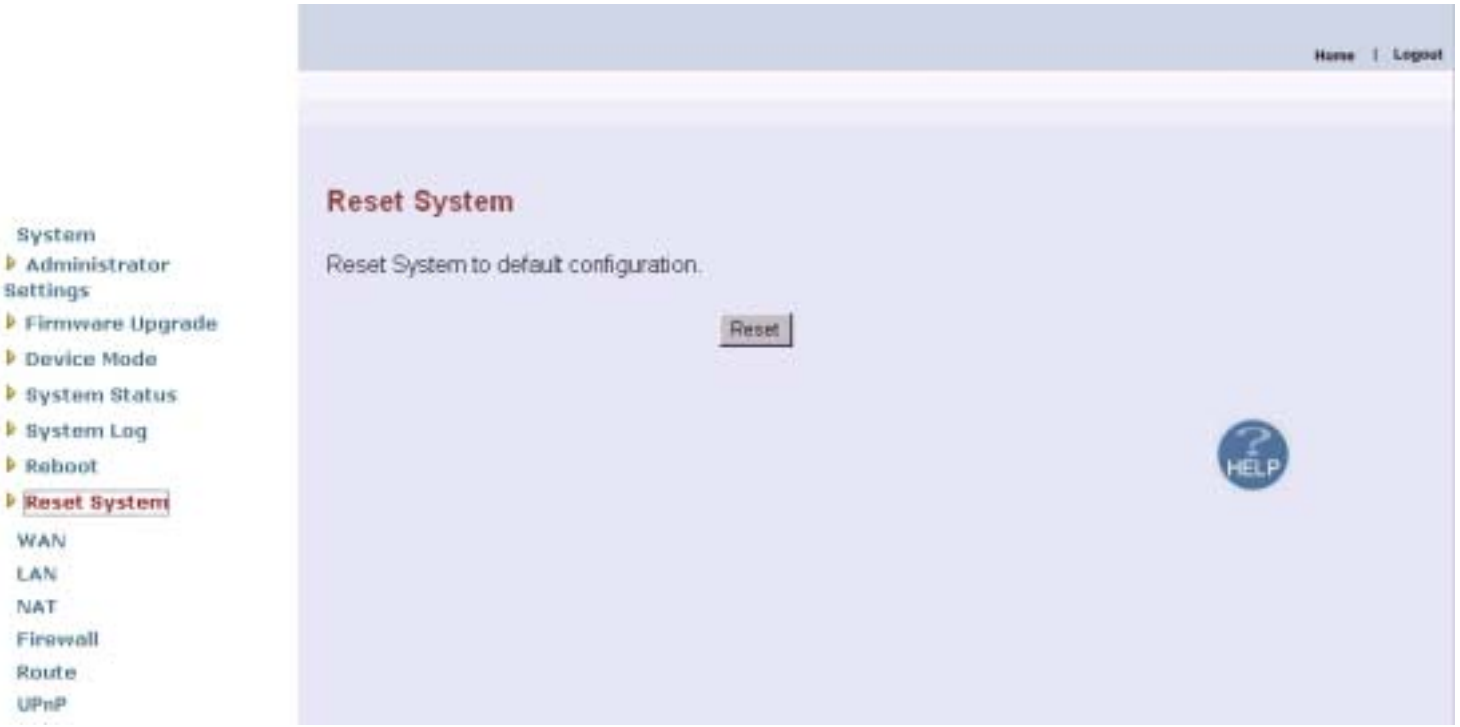


Figure 7.2.3.7 Reset VDSL2 CO/CPE MODEM Modem

- Click Reset to restart the system.

7.2.4 WAN

The WAN settings can be viewed in the left navigation bar. The following are the options available under WAN, as shown Figure 7.2.4:

- Dynamic IP
- Static IP
- PPPoE
- DNS

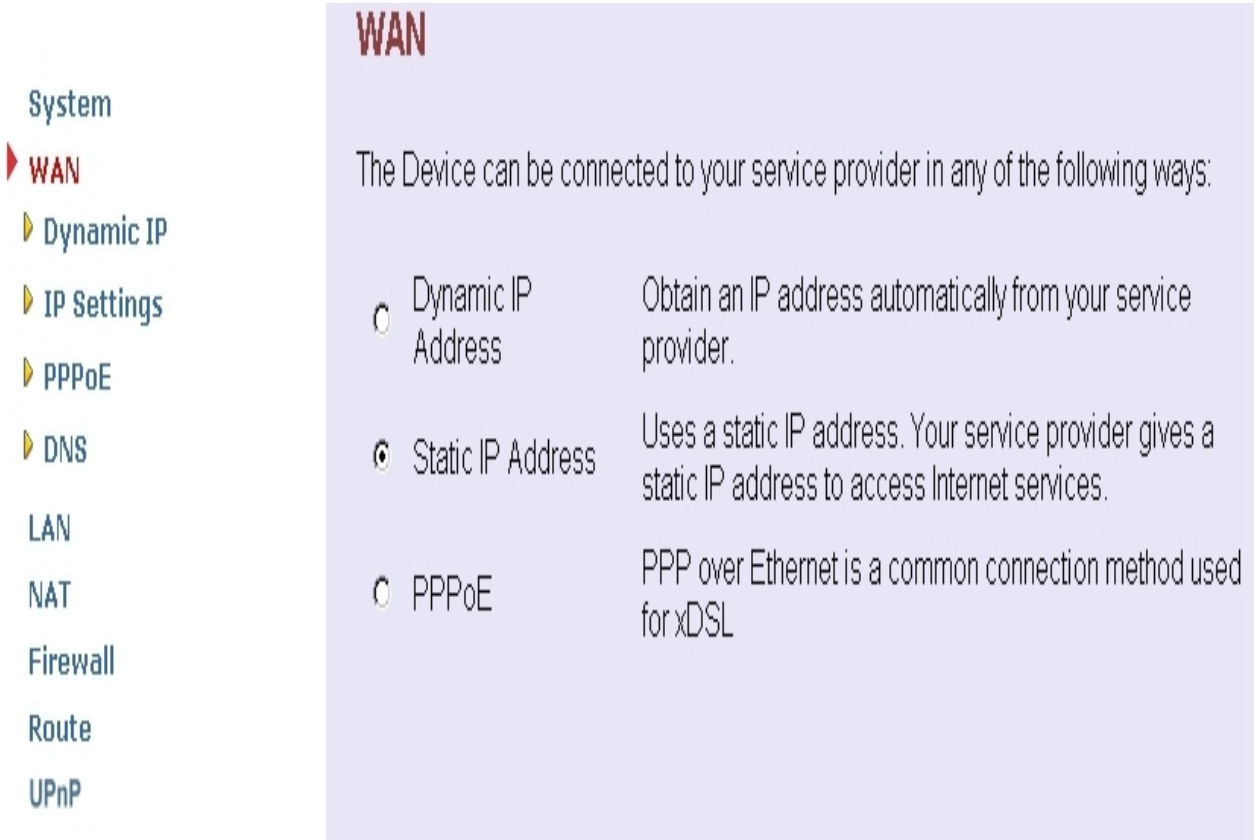


Figure 7.2.4 WAN Setting in Left Navigator Bar

7.2.4.1 Dynamic IP

To configure the WAN interface to dynamically obtain an IP Address, click on the Dynamic IP link in the left navigation bar. A screen is displayed as shown in Figure 7.2.4.1.

System
WAN
Dynamic IP
IP Settings
PPPoE
DNS
LAN
NAT
Firewall
Route
UPnP
Vdsl2
Dynamic IP
The Host Name is optional, but may be required by some Service Provider's. The default MAC address is set to the WAN's physical interface on the . If required by your Service Provider, use the "Clone MAC Address" button to copy the MAC address of the Network Interface Card installed in your PC and replace the WAN MAC address with this MAC address. The BigPond login is optional, commonly used in Australia. If your ISP need you to do the BigPond login, please enable it and fill the user name, password and the server name.
HELP
APPLY
CANCEL

Figure 7.2.4.1 Dynamic IP Configuration

The screen contains the following details:

- Click APPLY to save the information that has been entered.
- Click CANCEL to exit from this page.

7.2.4.2 Static IP

To configure the WAN interface to use a Static IP Address, click on the Static IP link in the left navigation bar. A screen is displayed as shown in Figure 7.2.4.2.

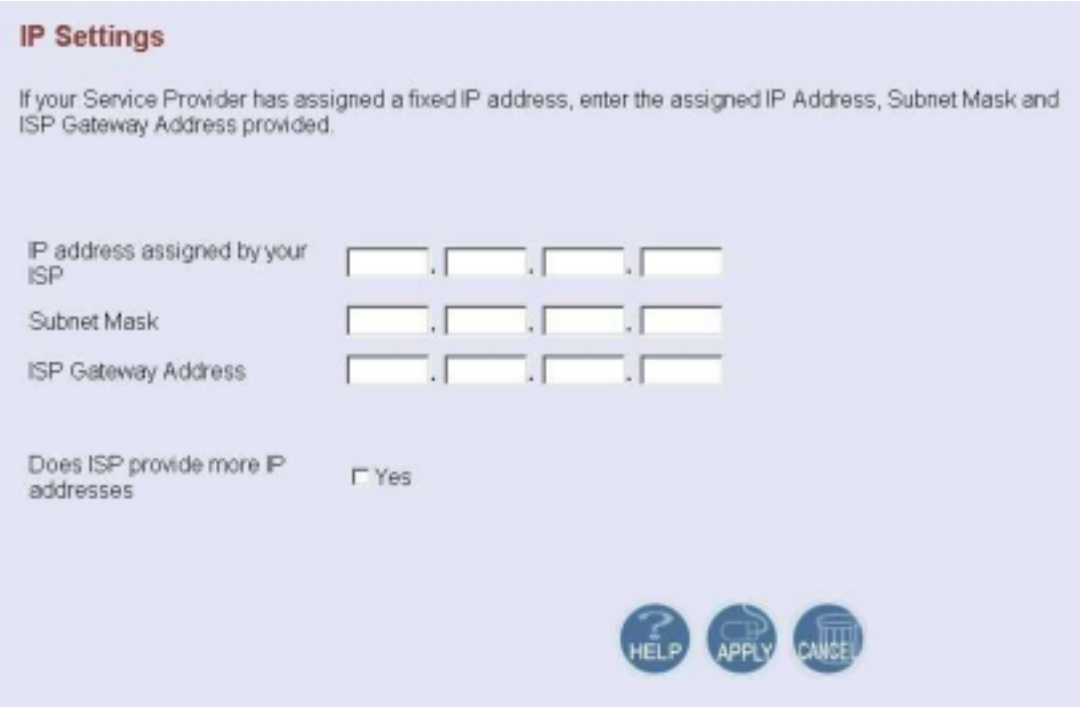

IP Settings
If your Service Provider has assigned a fixed IP address, enter the assigned IP Address, Subnet Mask and ISP Gateway Address provided.
IP address assigned by your ISP
Subnet Mask
ISP Gateway Address
Does ISP provide more IP addresses
Yes
HELP
APPLY
CANCEL

Figure 7.2.4.2 Static IP Configuration

The screen contains the following details:

Fields in Static IP

Field	Description
IP Address assigned by your ISP	Enter the IP Address of VDSL2 CO/CPE MODEM.
Subnet Mask	Enter the Subnet Mask of VDSL2 CO/CPE MODEM.

Fields in Static IP (cont'd)

Field	Description
ISP Gateway Address	Enter the Gateway address of the VDSL2 CO/CPE MODEM.
Does ISP provide more IP Address	Provides more IP Addresses of the WAN interface. Select the check box to enable this option. A screen is displayed as shown in Figure 41. Click Add to add IP Address and Subnet Mask.

7.2.4.3 PPPoE

To configure the WAN interface to use PPPoE, click on the PPPoE link in the left navigation bar. A screen is displayed as shown in Figure 7.2.4.3.

PPPoE
Enter the PPPoE user name and password assigned by your Service Provider. The Service Name is normally optional, by may be required by some service providers. Enter a Maximum Idle Time (in minutes)to define a maximum period of time for which the Internet connection is maintained during inactivity. If the connection is inactive for longer than the defined Maximum Idle Time, then it will be dropped. You can enable the Auto-reconnect option to automatically re-establish the connection as soon as you attempt to access the Internet again.
If your Internet Service Provider requires the use of PPPoE, enter the information below.
User Name
Password
Please retype your password
Service Name
MTU (1400-1492)
1492
Maximum Idle Time
0
(minutes)
Auto-reconnect
HELP
APPLY
CANCEL

Figure 7.2.4.3 PPPoE Configuration

The screen contains the following details:

Fields in PPPoE

Field	Description
User Name	Enter a name to use the PPPoE session.
Password	Enter the password of the login user.
Retype Password	Enter the password again to reconfirm.
Service Name	Enter a service name.

Fields in PPPoE (cont'd)

Field	Description
MTU	Enter the maximum connection units of the PPPoE. The MTU range is 1400 to 1492 bytes. By default, it is 1492.
Maximum Idle Time	This is the period of time required to keep the connection alive if no packets are transmitted. If no packets are transmitted between LAN port and WAN port or between VDSL2 CO/CPE MODEM and WAN, the connection is disconnected after the 'Maximum idle time. If the Auto-reconnect check box is selected, the PPP connection is re-established if there is some data that is received from the upper layers to be transmitted on this link.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.4.4 DNS

To configure the DNS address, click on the DNS link in the left navigation bar. A screen is displayed as shown in Figure 7.2.4.4:

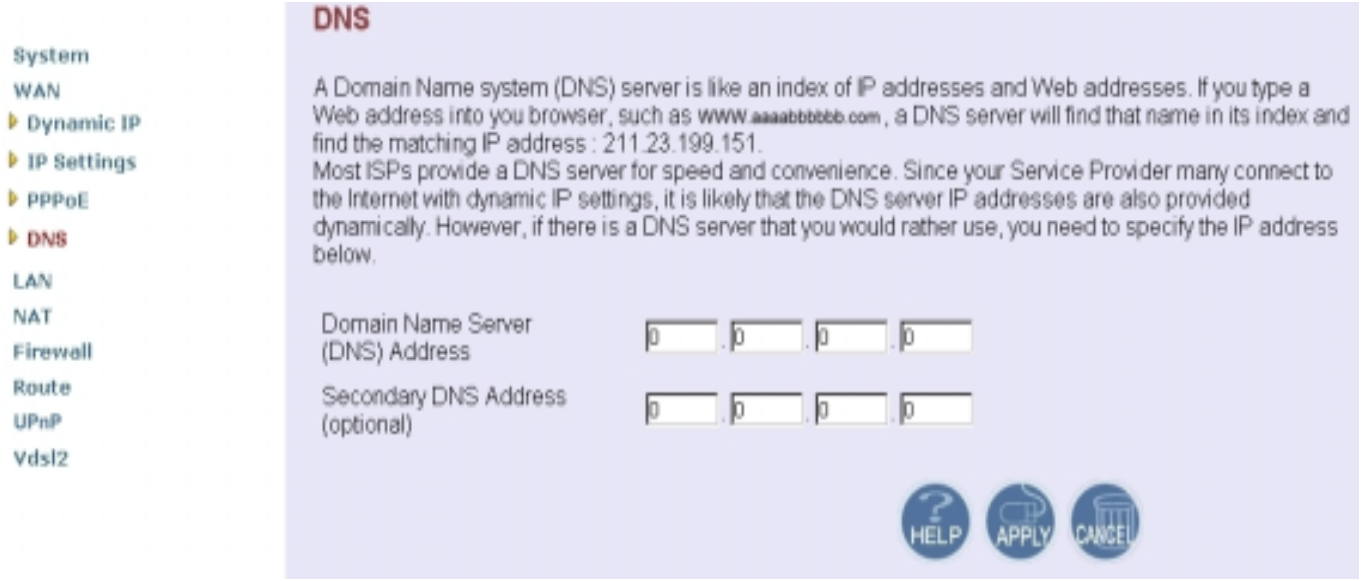

System
WAN
Dynamic IP
IP Settings
PPPoE
DNS
LAN
NAT
Firewall
Route
UPnP
Vdsl2
DNS
A Domain Name system (DNS) server is like an index of IP addresses and Web addresses. If you type a Web address into you browser, such as www.aaaabbbbbb.com , a DNS server will find that name in its index and find the matching IP address : 211.23.199.151.
Most ISPs provide a DNS server for speed and convenience. Since your Service Provider many connect to the Internet with dynamic IP settings, it is likely that the DNS server IP addresses are also provided dynamically. However, if there is a DNS server that you would rather use, you need to specify the IP address below.
Domain Name Server (DNS) Address
Secondary DNS Address (optional)
HELP
APPLY
CANCEL

Figure 7.2.4.4 DNS Configuration

The screen contains the following details:

Fields in DNS

Field	Description
Domain Name Server(DNS) Address	Enter the DNS address of the primary DNS server.
Secondary DNS Address(optional)	Enter the address of the secondary DNS server, if available.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.5 LAN

The LAN Setting can be viewed in the left navigation bar. The following are the options available under LAN, as shown in Figure 7.2.5:

- LAN Settings
- DHCP Client List
- LAN Switch Port Setting
- LAN Port Status

System
WAN
LAN
LAN Settings
DHCP Client List
LAN Switch Port Setting
LAN Port Status
NAT
Firewall
Route
UPnP
Vdsl2
LAN
The NV-600L must have an IP address for the local network. You can also enable DHCP service for dynamic IP address allocation to your clients, or configure filtering functions based on specific clients or protocols.

Figure 7.2.5 LAN in Left Navigator Bar

7.2.5.1 LAN Settings

Attention: For the VDSL2 CO/CPE MODEM it is recommended to select a simple IP setting suitable to controlled lab environments. Set a static IP address and don't use DHCP. The required steps are explained in Chapter 4.4 on Page 14!

To configure the LAN interface, click on the LAN Settings link in the left navigation bar. A screen is displayed as shown in Figure 7.2.5.1 in case of the VDSL2 CO/CPE MODEM kit..

Figure 7.2.5.1 LAN Settings

The screen contains the following details:

Fields in LAN Settings

Field	Description
IP Address	Enter the LAN interface IP Address of VDSL2 CO/CPE MODEM.
Subnet Mask	Enter the LAN Subnet Mask of VDSL2 CO/CPE MODEM.
The Gateway acts as DHCP Server	Enable or disables the DHCP Server of the VDSL2 CO/CPE MODEM. Select the check-box to enable this option.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.5.2 DHCP Client List

To view the DHCP client list, click on the DHCP Client List link in the left navigation bar. A screen is displayed to list all DHCP client connection with IP Address and MAC Address as shown in Figure 7.2.5.2.

Figure 7.2.5.2 DHCP Client List

7.2.5.3 LAN Switch Port Setting

To view the All Lan Port Setting, click on the All Lan Port Setting link in the left navigation bar. A screen is displayed to All Lan Port Setting as shown in Figure 7.2.5.3.

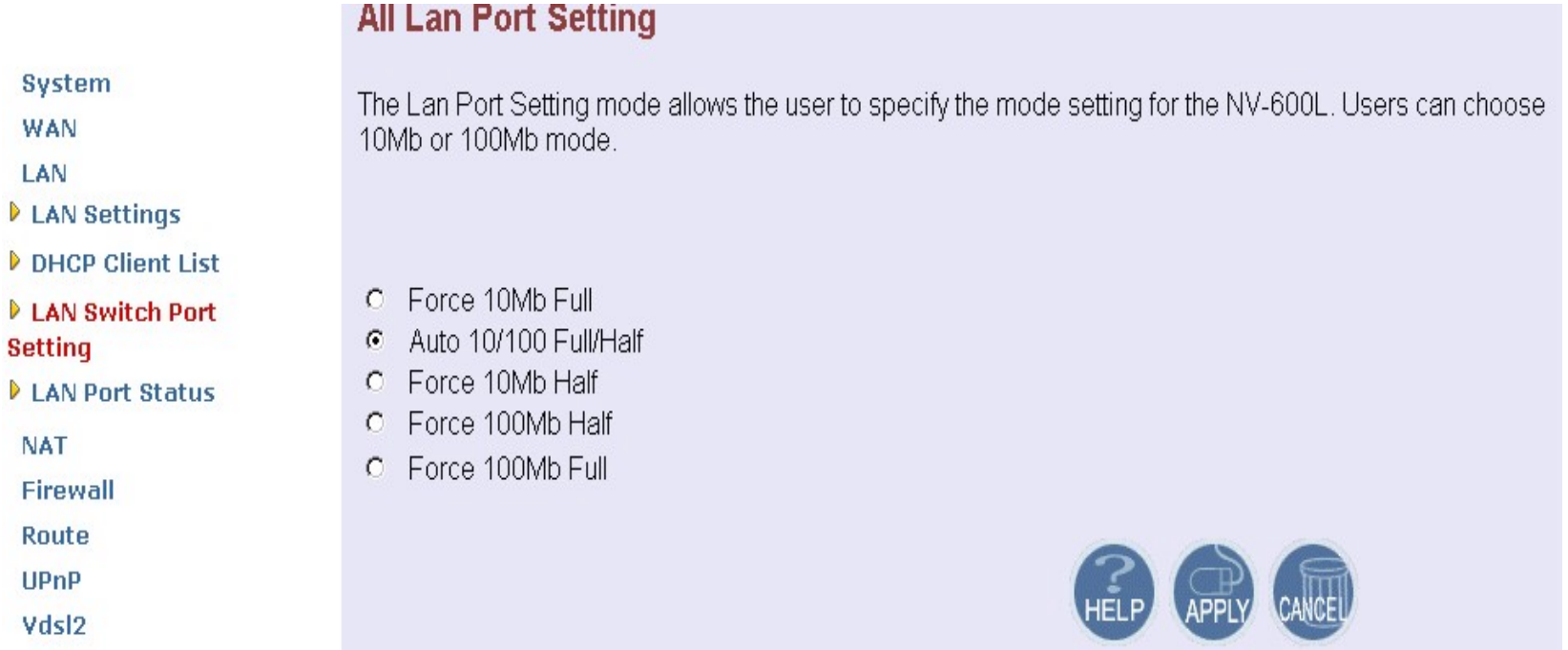


Figure 7.2.5.3 DHCP Client List

7.2.5.4 LAN Port Status

The following information provides a view of the current Ethernet ports status of the unit

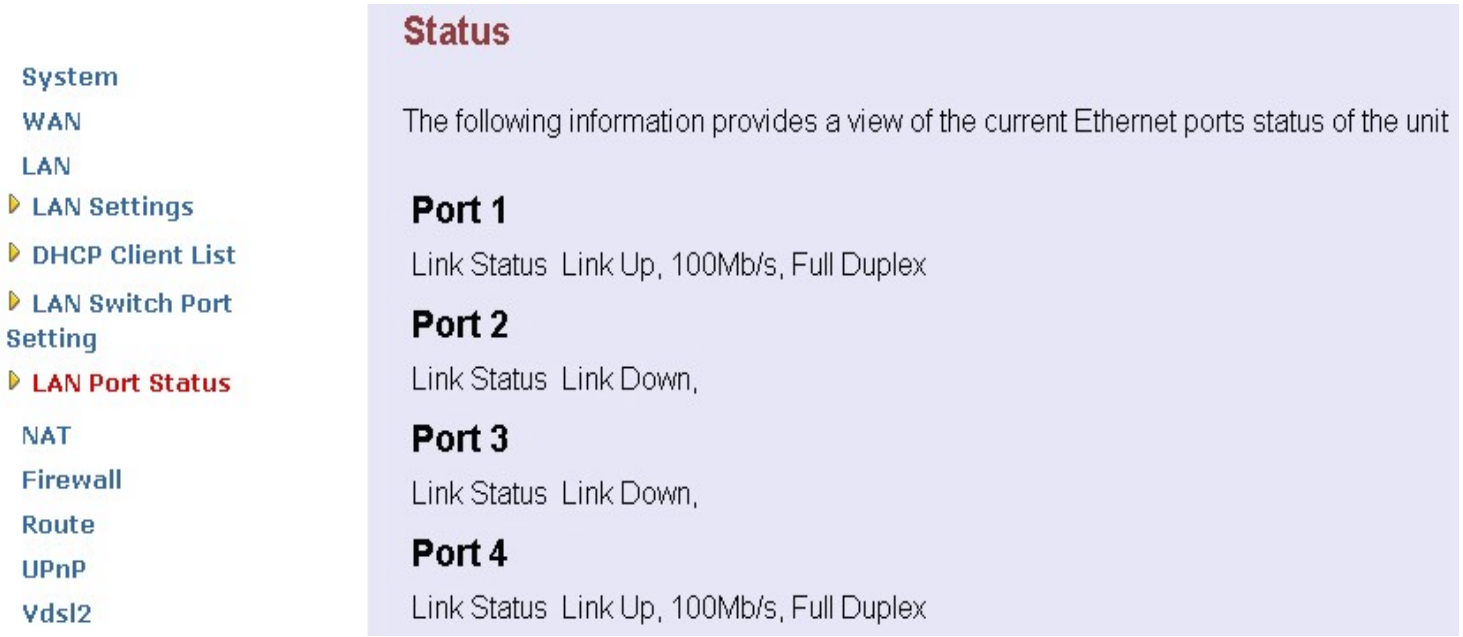


Figure 7.2.5.4 LAN Port Status

7.2.6 NAT

The NAT Settings can be viewed in the left navigation bar. The following are the options available under NAT, as shown in Figure 7.2.6:

- Virtual Server
- Port Mapping
- DMZ

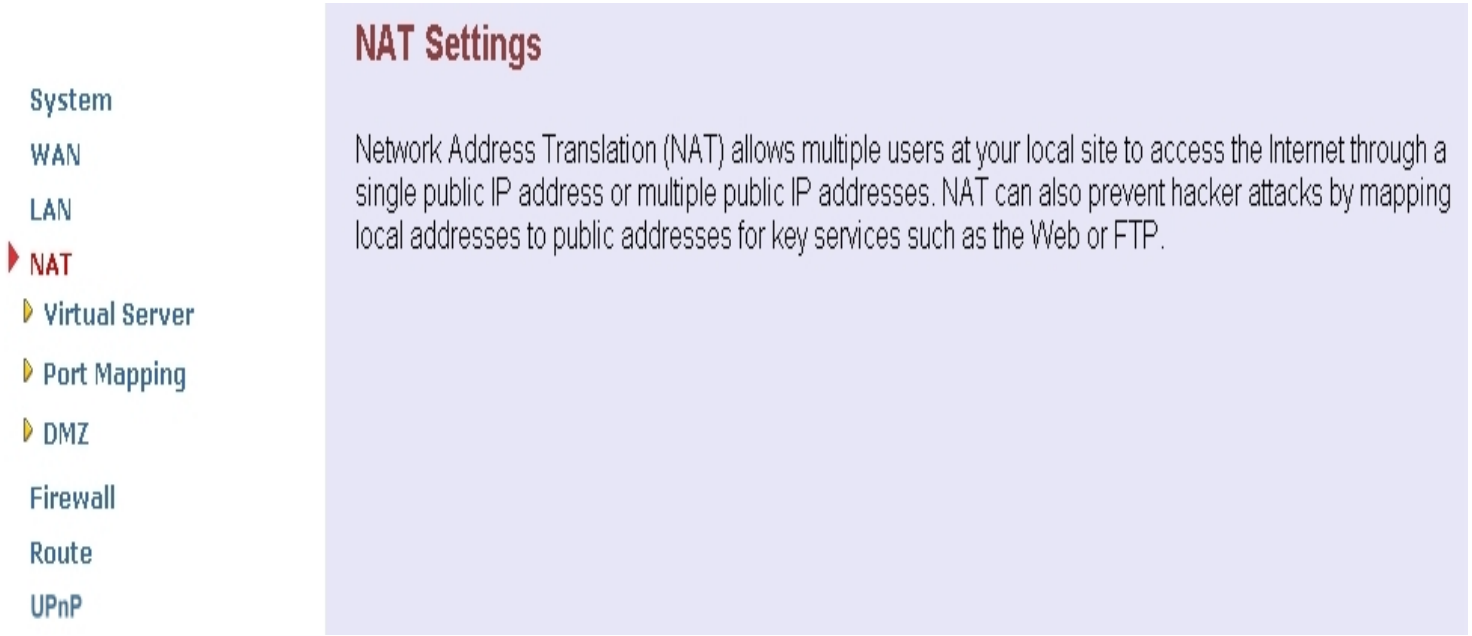

System
WAN
LAN
NAT
Virtual Server
Port Mapping
DMZ
Firewall
Route
UPnP
NAT Settings
Network Address Translation (NAT) allows multiple users at your local site to access the Internet through a single public IP address or multiple public IP addresses. NAT can also prevent hacker attacks by mapping local addresses to public addresses for key services such as the Web or FTP.

Figure 7.2.6 NAT in Left Navigator Bar

7.2.6.1 Virtual Server

To configure virtual server, click on the Virtual Server link in the left navigation bar. A screen is displayed as shown in Figure 7.2.6.1:

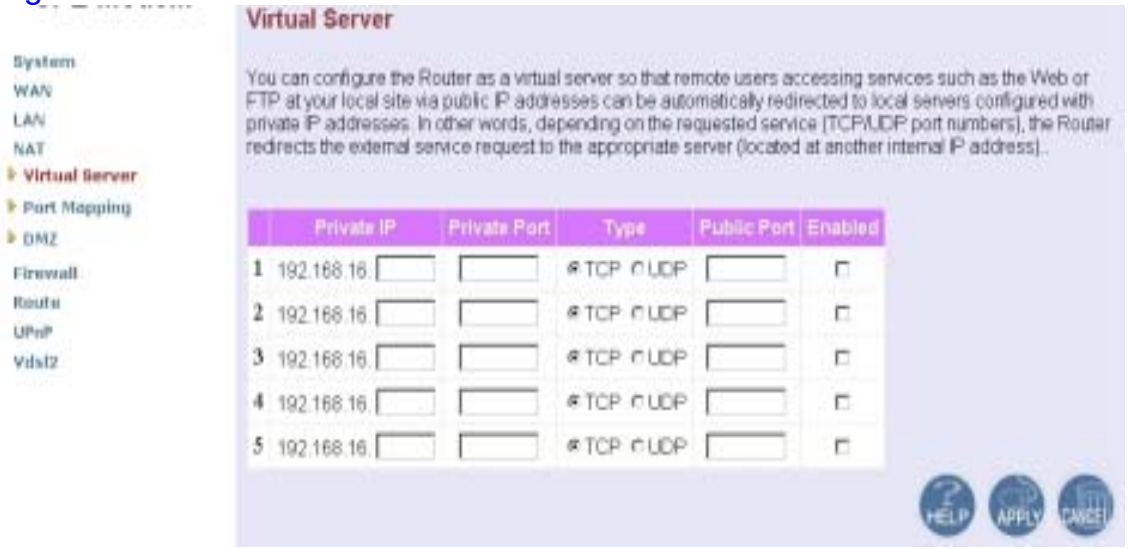

System
WAN
LAN
NAT
Virtual Server
Port Mapping
DMZ
Firewall
Route
UPnP
Vdsl2
Virtual Server
You can configure the Router as a virtual server so that remote users accessing services such as the Web or FTP at your local site via public IP addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depending on the requested service (TCP/UDP port numbers), the Router redirects the external service request to the appropriate server (located at another internal IP address).
Private IP
Private Port
Type
Public Port
Enabled
1 192.168.16.
2 192.168.16.
3 192.168.16.
4 192.168.16.
5 192.168.16.
TCP UDP
HELP
APPLY
CANCEL

Figure 7.2.6.1 Virtual Server Configuration

The screen contains the following details:

Fields in Virtual Server

Field	Description
Private IP	Enter a private IP Address of specified entry.
Private Port	Enter a private Port number of the specified entry.
Type	Select virtual server protocol type of the specified entry.
Public Port	Enter a public port number of the internet user to access the virtual server.
Enabled	Enable the specified entry of the virtual server.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.6.2 Port Mapping

To configure Port Mapping, click on the Port Mapping link in the left navigation bar. A screen is displayed as shown in Figure 7.2.6.2:

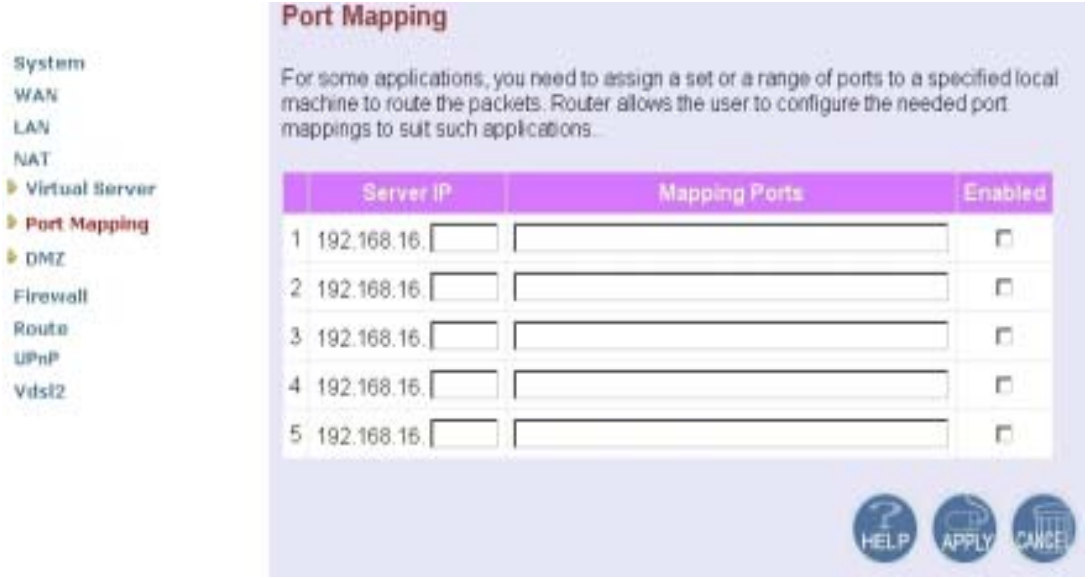


Figure 7.2.6.2 Port Mapping Configuration

The screen contains the following details:

Fields in Port Mapping

Field	Description
Server IP	Enter the IP Address of a specified local machine.
Mapping Port	Assign a range of port or specific port number to route the packets.
Enabled	Enable a specified entry of the Port Mapping.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.6.3 DMZ

To configure the DMZ, click on the DMZ link in the left navigation bar. A screen is displayed as shown in Figure 7.2.6.3:

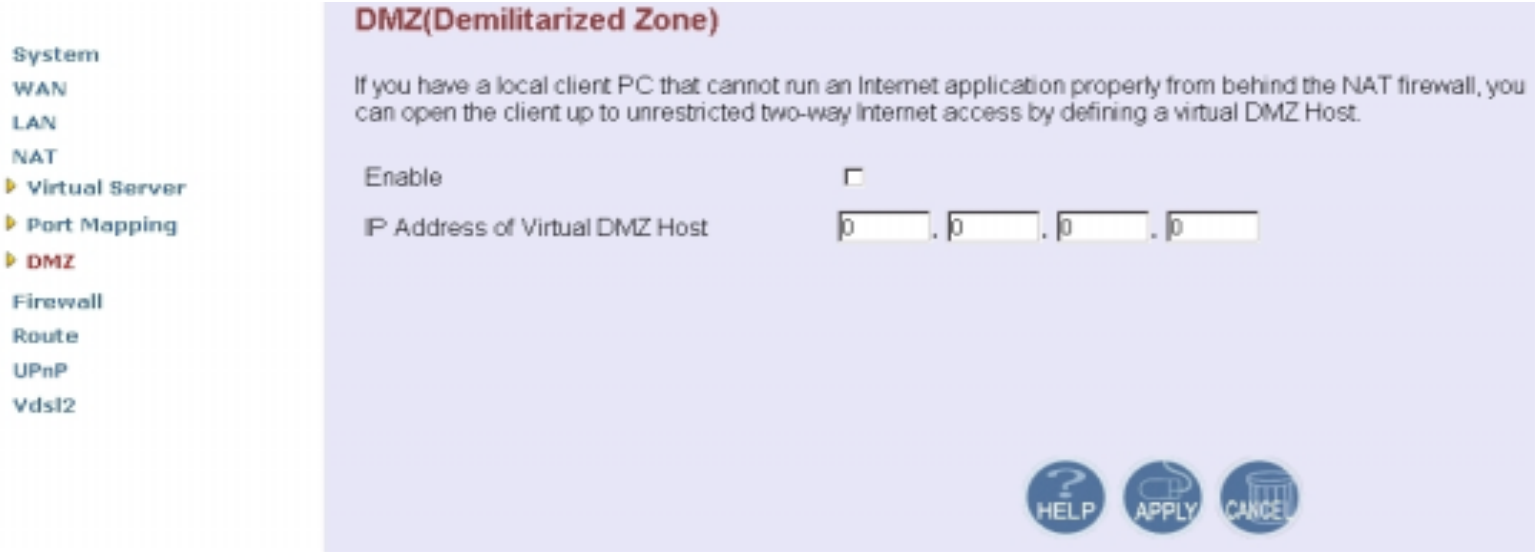


Figure 7.2.6.3 DMZ Configuration

The screen contains the following details:

Fields in DMZ

Field	Description
Enable	Enable or disable the DMZ setting of VDSL2 CO/CPE MODEM. Select the check box to enable this option.
IP Address	Enter IP Address of the DMZ host.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.7 Firewall

The Firewall Settings can be viewed in the left navigation bar. The following are the options available under Firewall, as shown in Figure 7.2.7:

- Firewall Options
- Client Filter MAC Control
- MAC Control

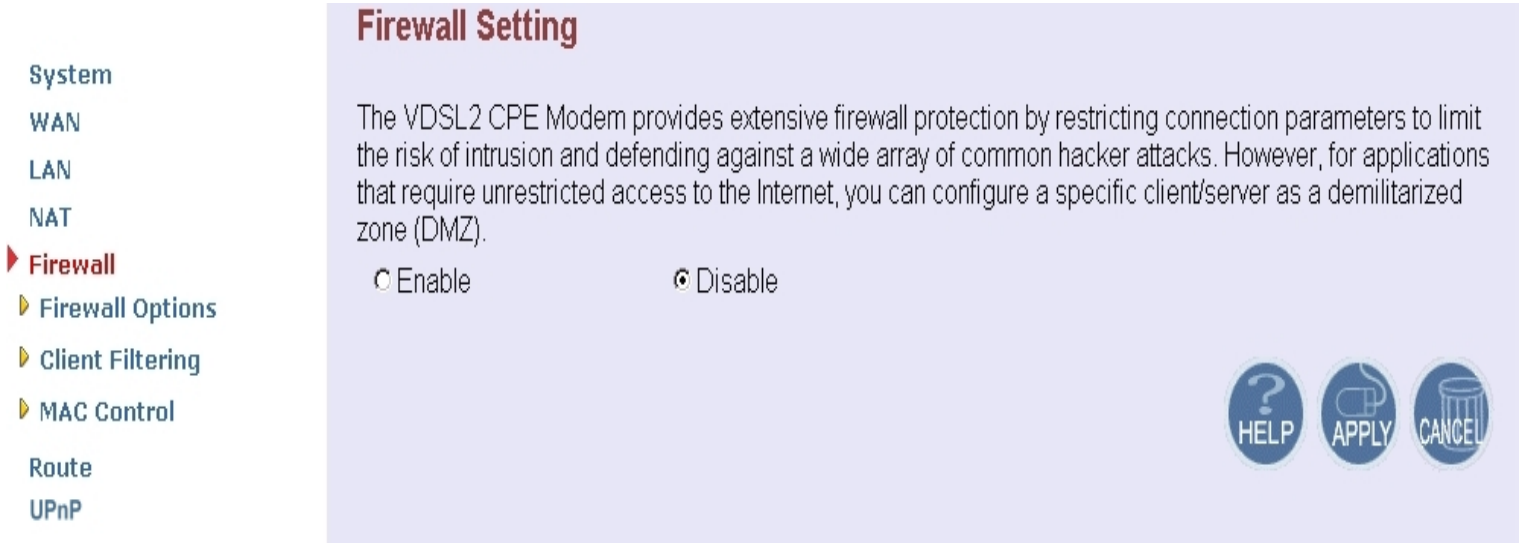

System
WAN
LAN
NAT
Firewall
Firewall Options
Client Filtering
MAC Control
Route
UPnP
Firewall Setting
The VDSL2 CPE Modem provides extensive firewall protection by restricting connection parameters to limit the risk of intrusion and defending against a wide array of common hacker attacks. However, for applications that require unrestricted access to the Internet, you can configure a specific client/server as a demilitarized zone (DMZ).
Enable
Disable
HELP
APPLY
CANCEL

Figure 7.2.7 Firewall in Left Navigator Bar

7.2.7.1 Firewall Options

To enable the firewall options, click on the Firewall Options link in the left navigation bar. A screen is displayed as shown in Figure 7.2.7.1:

Figure 7.2.7.1 Firewall Options Configuration

The screen contains the following details:

Fields in Firewall Options

Field	Description
Enable Hacker Attack Protect	Select the check box to log and drop all the hacker attack events.
Discard PING from WAN	Select the check box to drop all PING from the WAN side.
Discard PING the Gateway	Select the check box to drop all PING to VDSL2 CO/CPE MODEM packet for the LAN side.
Drop Port Scan	Select the check box to drop all the port scan packets.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.7.2 Client Filter

To enable Client Filter, click on the Client Filter link in the left navigation bar. A screen is displayed as shown in Figure 7.2.7.2.

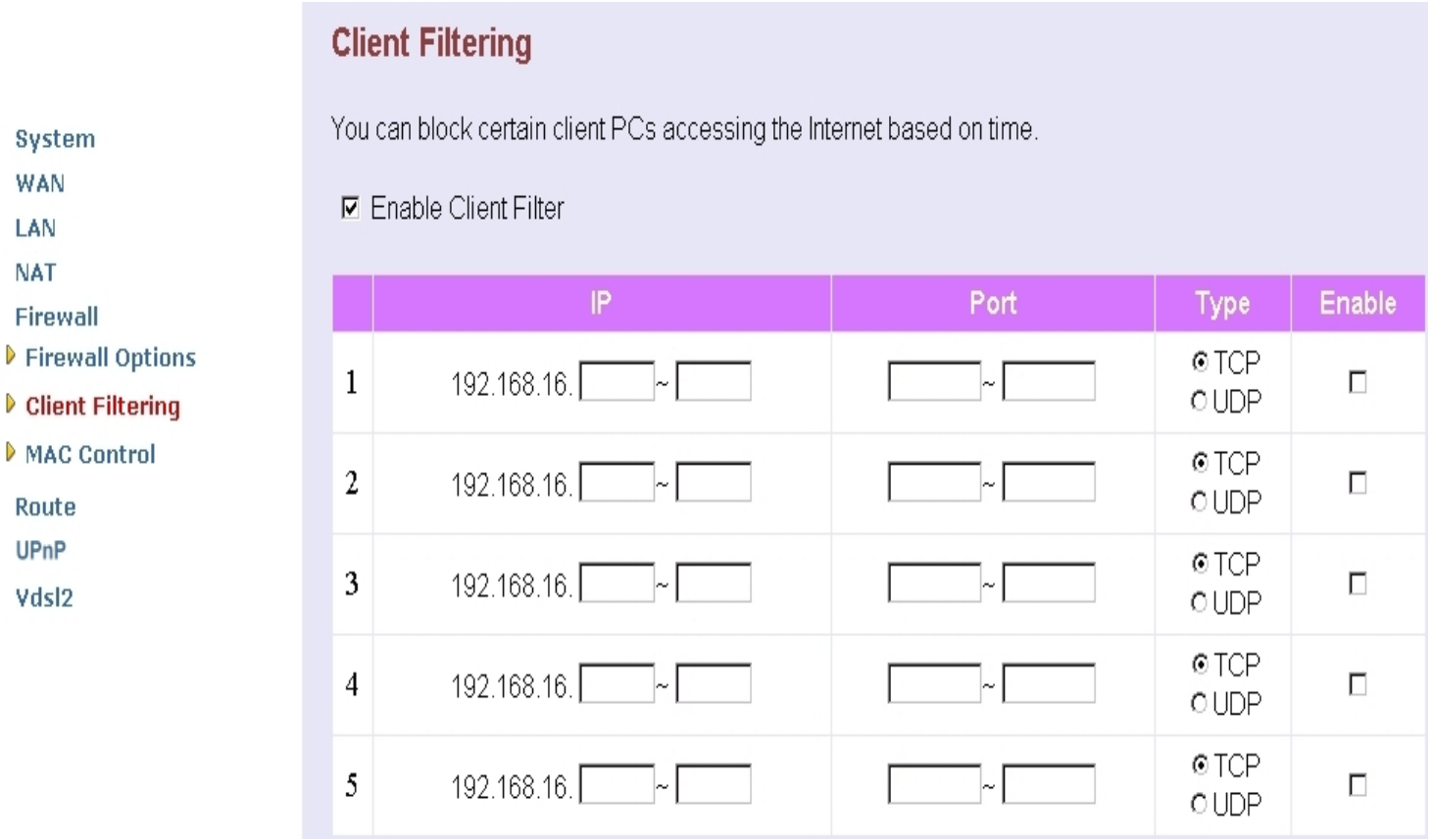


Figure 7.2.7.2 Client Filter Configuration

The screen contains the following details:
Fields in Client Filter

Field	Description
Enable Client Filter	Enable or disable the Client Filter feature of VDSL2 CO&CPE MODEM. Select the check box to enable this option.
IP	Enter the filter IP Address range of the local machines under VDSL2 CO&CPE MODEM.
Port	Enter the filter Port number range of the local machines under VDSL2 CO&CPE MODEM.
Type	Select TCP or UDP to filter the protocol type packets from the local machines.
Enable	Provides more IP Addresses of the WAN interface.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.7.3 MAC Control

To configure MAC Control, click on the MAC Control link in the left navigation bar. A screen is displayed as shown in Figure 7.2.7.3

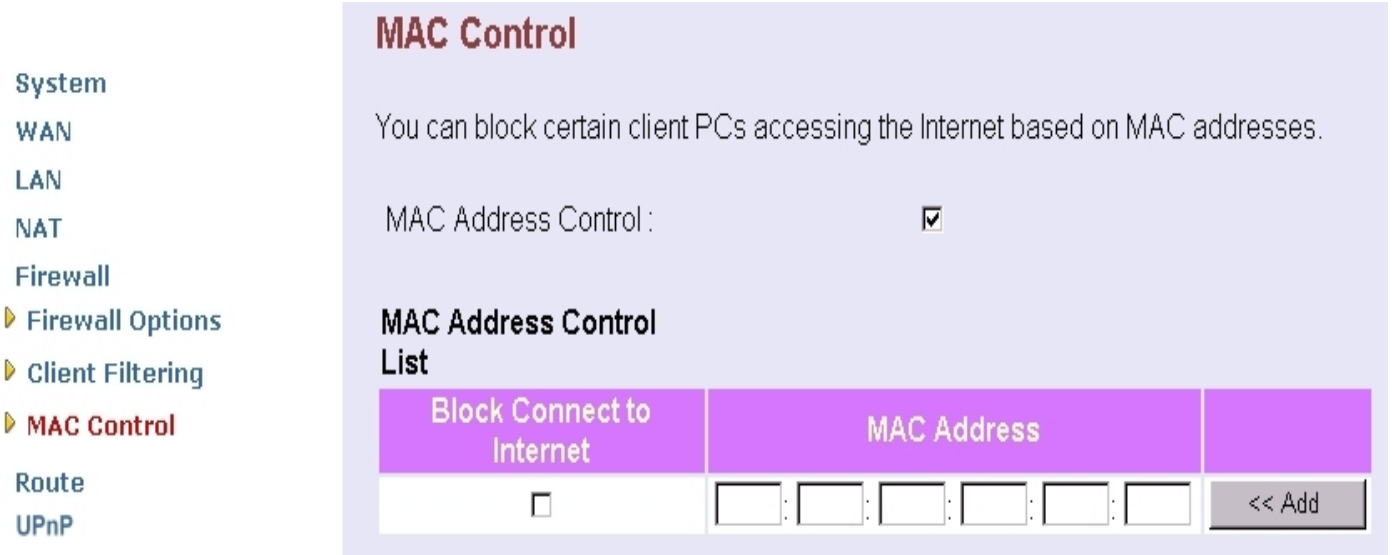


Figure 7.2.7.3 MAC Control Configuration

The screen contains the following details:

Fields in MAC Control

Field	Description
MAC Address Control	Enable or disable the MAC address control.
Block Connection to Internet	Enable or disable block status. If the check box is selected, it blocks the specified MAC address.
MAC Address	Assign the blocking MAC address for local machine.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY to save the information that has been entered.

7.2.8 Route Settings

The Route Settings can be viewed in the left navigation bar. The following are the options available under Route, as shown in Figure 7.2.8:

- Routing Table List

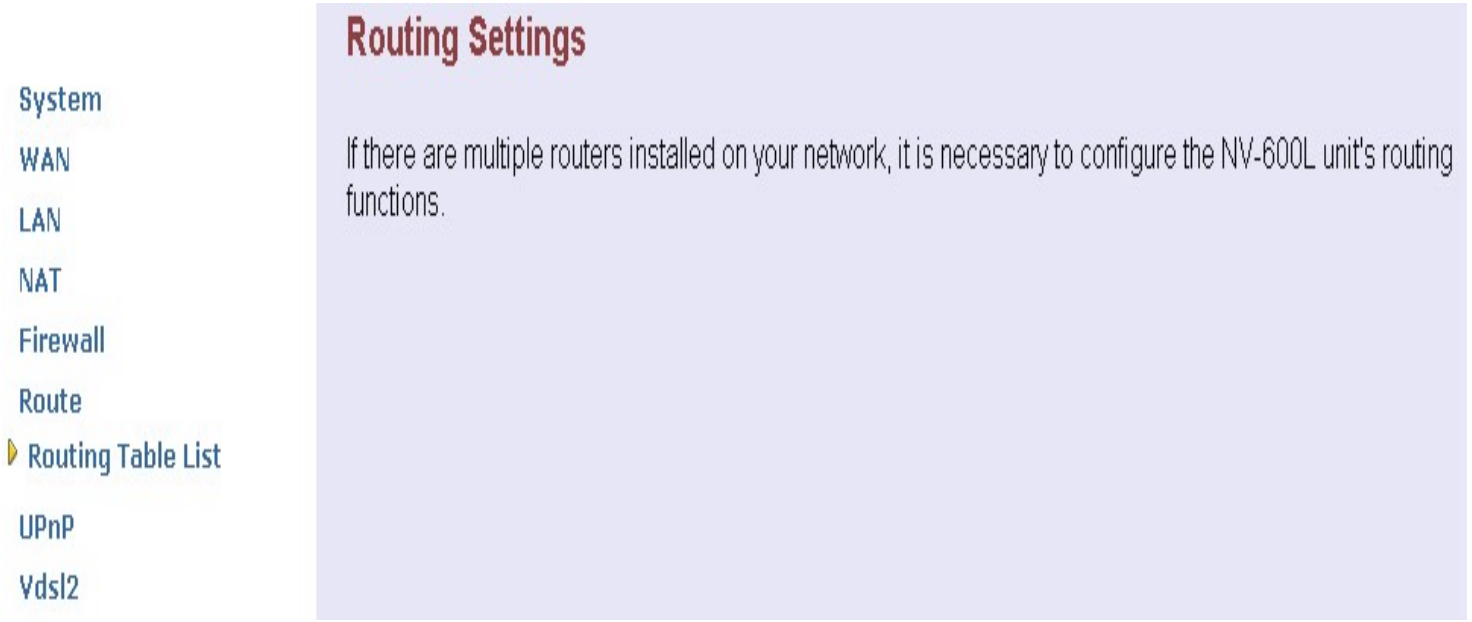


Figure 7.2.8 Route in Left Navigator Bar

7.2.8.1 Routing Table List

To view the Routing entry table list of VDSL2 CO/CPE MODEM, click on the Routing Table by link in the left navigation bar.

A screen is displayed as shown in Figure 7.2.8.1.

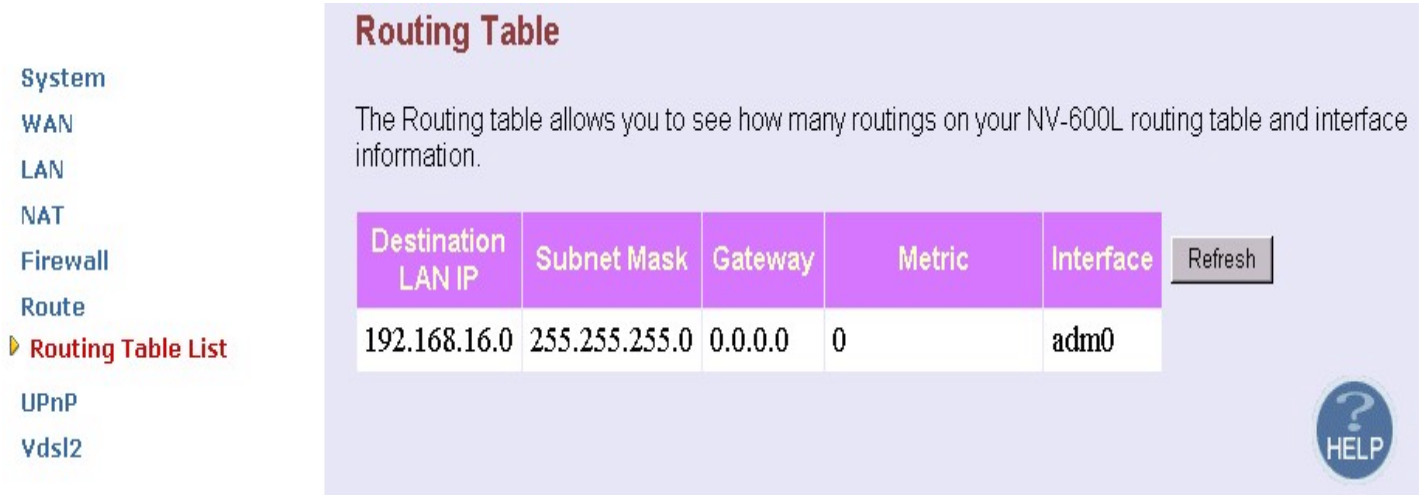


Figure 7.2.8.1 Routing Table List

The screen contains the following details:

- Click Refresh to update currently routing list of the VDSL2 CO/CPE MODEM.

7.2.9 UPnP Setting

The UPnP Settings can be viewed in the left navigation bar. The following are the options available under UPnP, as shown in Figure 7.2.9:

Home | Logout
UPnP
UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, wireless devices, and PCs of all from factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. The supports the UPnP InternetGatewayDevice for Home Networking.
System
WAN
LAN
NAT
Firewall
Route
UPnP
Settings
Vdsl2

Figure 7.2.9 UPnP in Left Navigator Bar

7.2.9.1 Settings

To enable or disable the UPnP Settings, click on the Settings link in the left navigation bar. A screen is displayed as shown in Figure 7.2.9.1.

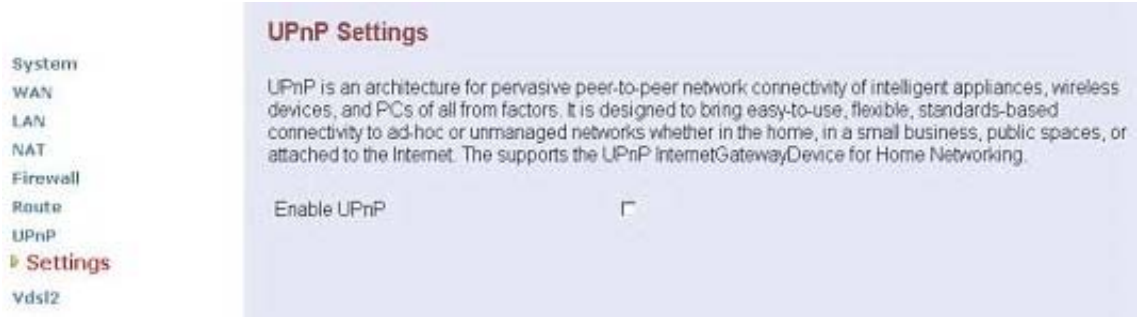

System
WAN
LAN
NAT
Firewall
Route
UPnP
Settings
Vdsl2
UPnP Settings
UPnP is an architecture for pervasive peer-to-peer network connectivity of intelligent appliances, wireless devices, and PCs of all from factors. It is designed to bring easy-to-use, flexible, standards-based connectivity to ad-hoc or unmanaged networks whether in the home, in a small business, public spaces, or attached to the Internet. The supports the UPnP InternetGatewayDevice for Home Networking.
Enable UPnP

Figure 7.2.9.1 UPnP Configuration

The screen contains the following details:

Table 22 Fields in UPnP Settings

Field	Description
Enable UpnP	To enable or disable UPnP Setting. Select the check box to Enable or Disable the UPnP function of SPEED-VDSL2 CO&CP MODEM.

- Click CANCEL to exit from this page without saving the changes.
- Click APPLY at any time during configuration to save the information that you have entered.

Appendix A: Product Features & Specification

Features:

- Compliant with IEEE 802.3 & 802.3u Ethernet Standards
- Compliant with ETSI, ITU, ANSI VDSL standards
- Provides 4 x 10/100M auto-sensing RJ-45 Ethernet ports
- Supports Bandwidth setup with 100 Mbps VDSL RJ-11 ports
- POTS / ISDN Splitter port RJ-11 x 1 (Splitter on board)
- Supports auto speed for VDSL2 port
- Supports Web management(HTTP)
- Supports TFTP
- Supports PPPOE
- Supports NAT/DHCP/DMZ
- Supports Firewall
- Supports Route & Switch mode
- Supports UPnP
- Supports Loop back
- Supports SNR indicator
- Support 8a,8b,8c,8d,12a,12b,17a,17b,30a band profile
- Support 997,998 band plan
- Provides surge protection for VDSL2 port

Specifications:

- Compliant with IEEE 802.3 & 802.3u Ethernet Standards
- Compliant with ETSI, ITU, ANSI VDSL2 standards
- 10/100M auto-sensing/auto-MDIX RJ-45 Ethernet ports x 4
- VDSL2 RJ-11 port x 1 (VDSL2 CO MODEM / VDSL2 CPE MODEM)
- POTS / ISDN Splitter port RJ-11 x 1
- Switch method: store and forward

- Flow control Full duplex: IEEE 802.3x
  Half duplex: Back pressure
- Driver capable: 100 M: 0.3 Km
- Indication LED x 6: Power LED x1
  Ethernet Link/Active LED x 4
  VDSL Link LED x 1
- Console port: RS-232C/115200bps
- Dimension: L x W x H = 184mm x 146mm x 40mm(7.2" x 5.74" x 1.57")
- Operating temperature: 0°C to 50°C (32 to 122F)
- Operating humidity: 10% to 90% (non-condensing)
- Storage temperature: -20 to 65°C (-4F to 149F)
- AC to DC adapter
  Input range: 100VAC~240VAC/50~60Hz
  Output: 12VDC/1A
- Power consumption: 7.5w
- EMI Compliant: CE, FCC, VCCI
- Chipset: Infineon

Appendix B: Troubleshooting

1. **Symptom**: Connected the Co-Modem with CPE-Modem within 300 meters RJ-11 phonecable got only less than 10 Mbit/s.

   Cause: Some testing program which is base on TCP/IP protocol such as FTP, Iperf, NetIQ, the bandwidth of testing outcome will be limited by TCP window size.

   Solution: We recommand to test VDSL2 bandwidth best by Smartbit equipment, if you don't have Smartbit, we recommand test that by IPERF program, and TCP window size must be setted max. 64k, the parameter as iperf –c co side ip address–I 1 –t 50 –w 65535 for client side.

Appendix C : Compliance and Safety Information

FCC Radio Frequency Interference Statement

This equipment has been tested to comply with the limits for a computing device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use and radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by taking one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the distance between the equipment and receiver.
3. The equipment and the receiver should be connected to outlets on separate circuits.
4. Consult the dealer or an experienced radio/television technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If this telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Important Safety Instructions

Caution:The direct plug-in wall transformer serves as the main product for disconnecting. The socket outlet shall be installed near the product and be readily accessible.

Caution:Use only the power supply included with this product. In the event the power supply is lost or damaged:In the United States, use only with CSA certified or UL listed Class 2 power supply, rated 12Vdc 1A or above.

IN Europe, use only with CE certified power supply, rated 12Vdc 1A or above.

Do not use this equipment near water, for example in a wet basement.

Avoid using a telephone during an electrical storm. There may be a remote risk of electrical shock from lightning.

Do not use the telephone to report a gas leak in the vicinity of the leaking area.

If you experience trouble with this unit, please contact customer service at the address and phone listed below. DO NOT DISASSEMBLE THIS EQUIPMENT. It does not contain any user serviceable components.

FCC Warning

This equipment has been tested to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment can generate, use, and radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at owner's expense.

CE Mark Warning

This is a CE class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Warranty

The original owner of this package will be free from defects in material and workmanship for one year parts after purchase. For the warranty to apply, you must register your purchase by returning the registration card indicating the date of purchase.

There will be a minimal charge to replace consumable components, such as fuses, power transformers, and mechanical cooling devices. The warranty will not apply to any products which have been subjected to any misuse, neglect or accidental damage, or which contain defects which are in any way attributable to improper installation or to alteration or repairs made or performed by any person not under control of the original owner.

The above warranty is in lieu of any other warranty, whether express, implied, or statutory, including but not limited to any warranty of merchantability, fitness for a particular purpose, or any warranty arising out of any proposal, specification, or sample. Shall not be liable for incidental or consequential damages. We neither assumes nor authorizes any person to assume for it any other liability.

Note: Please do not tear off or remove the warranty sticker as shown, otherwise the warranty will be void.